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Report of the Society for 1961

THE membership of the Society at the end of October, 1961, was 1,530, a small increase over that for the immediately previous year. Comparing this figure with those of the previous three years, at the end of 1958 the figure was 1,693, but this was the year of the Centenary Exhibition, and one during which the appeal for each member to bring one more member into the Society was being actively pursued. In 1959, after the subscription had been increased the figure was 1,564 and in 1960 it had dropped to 1,517.

It will be interesting to watch the trend of the membership figures in the future in view of the apparent general awakening of interest in natural history in the post-war years.

It is with regret that the death is announced of the following members of the Society; Mr. H. E. Stevenson, who joined the Society in 1903 and was made an honorary member in 1953; Lt. Col. H. G. Brownlow, who was well known as a distinguished ornithologist; and Miss V. Staines, who was for many years secretary of the Archaeology Section.

We are pleased to announce that Mr. N. Niblett, who has been a member of the Society since 1926, has been elected an honorary member. Mr. Niblett will be known to many for his numerous papers published in the *London Naturalist*.

In April of this year the Royal Society for the Protection of Birds decided to move their headquarters from London into the country, and as a consequence gave the Society notice to quit their premises at Eccleston Square with effect from October 1, 1961. The Society has suffered a severe blow in the loss of these rooms which were used for committee meetings and for many informal sectional meetings.

It is pleasant to report that the Royal Society for the Protection of Birds, realizing the predicament in which the Society found itself, donated the sum of £125.

In an endeavour to avoid the storage of the library and collections which would then not be generally available to members, approaches were made to many industrial firms and to the London County Council, the Nature Conservancy, and the Council for Nature. In spite of these efforts supported by publicity in the press, on radio and television, this measure became unavoidable. However, through the timely aid of the Honorary President, Professor H. Munro Fox, F.R.S., arrangements were made to store the library and collections at Queen Mary College, Mile End where they now are. The Society is very grateful to the Registrar, Colonel R. P. Tong, for his assistance in providing storage accommodation at the College for two years, but the Council is giving this matter urgent attention in view of the limited period this facility will be available.

Through the courtesy of the Director General of the Nature Conservancy, Mr. E. M. Nicholson, C.B., M.B.O.U., the Council and its Administration and Finance Committee will meet in the Conservancy's offices at Belgrave Square.

The Council desires to place on record an expression of its thanks to all those members who cheerfully undertook the heavy burden of packing the valuable collection of books and specimens for the move from Eccleston Square to Queen Mary College. In particular it is appreciative of the heavy tasks performed by the Librarian, Mr. J. Graham Harvey, who spent many hours sorting and packing the books.

The Council is also very grateful to the Honorary General Secretary, Mrs. L. M. P. Small, who in addition to her many other duties spent very many hours pursuing possibilities of alternative accommodation.

The Royal Society, as a result of the personal representations of one of the officers, gave a special grant of £100 towards the costs incurred in binding periodicals and other library expenses. We also gratefully acknowledge the receipt through the Royal Society of a Parliamentary grant-in-aid of £150 towards the cost of publication of the *London Naturalist* and the *London Bird Report*.

Concern is felt by the Council for the future of the Young Naturalists' Section. Many officers and committee members have had to relinquish their appointments at short notice, to take advantage of openings offered to them or to engage in academic study. The obvious need is for continuity of officers and the Council will give this problem its attention during the coming year.

Whilst it may appear to be invidious to select one of the Society's research activities for special comment it is noteworthy that the Bookham Common Survey which is now in its twentieth season has become a centre of co-operative research. The year under review is the second during which the Conservation Corps of the Council for Nature has continued its work of scrub clearance. The Nature Conservancy investigated the results of chemical treatment of the hawthorn stumps, and the vegetation of the cleared area was studied by members of the Society's survey team. Some members of the team are investigating the small mammal population by live trapping, and other members are co-operating with the British Trust for Ornithology in their breeding season census of common species. A member of the survey team has been elected to the Bookham Common Committee of the National Trust, which has led to a much closer liaison between the Society and the National Trust.

Many members of the Society took part in the repeat census of the Mute Swan in 1961, part of a national enquiry organized by the British Trust for Ornithology and the Wild Fowl Trust.

A somewhat unusual venture for the Society was a Christmas party, held at Eccleston Square on December 21, 1960. Organized by the Honorary General Secretary, Mrs. L. M. P. Small, this was a most successful social event and resulted in a considerable sum of money being added to the Society's funds.

The decision of the Council to discontinue in future editions of the *London Naturalist* separate reports by the various sections, and to embody those points of general interest in one report of the Society will not meet with unqualified approval. A project upon which a section has lavished hours of careful work may be dealt with in a few words or not mentioned at all. Because of this, the detail which follows should not necessarily be taken as the pattern for future years.

The Archaeology Section draw attention to the importance of the opening of a new Greek and Roman Room at the British Museum, to which with the Ramblers' Section a visit was paid. Mention is made by this section of the value of a visit to the London University Institute of Archaeology where the preparatory work on specimens for exhibition or storage of objects of all descriptions was seen.

Practical work included two digs on Roman roads in South East London and the survey of a house threatened with demolition in Merton.

The Botany Section during the year under review have held the highest number of meetings for the past five years, a total of thirty-five meetings, and have maintained their record for fair weather for field meetings, rain hampering only two out of the twenty-five arranged.

The Society's collection of flowering plants and ferns built up over the years reached such proportions that during the year it has been the subject of much work. Because of a certain amount of damage by mites, steps were taken for the whole collection to be treated, and the Society is deeply indebted to the Keeper of Botany at the British Museum (Natural History) for affording the use of apparatus and permitting museum staff to assist. During the course of this work it was realized that the collection, if it was to be properly cared for in the future, would have to be reduced in size. A decision was therefore made to retain one sheet of each species enclosed in new folders for the Society's Herbarium, donating all other sheets to the British Museum for incorporation into their collections. As the L.N.H.S. Herbarium is thus divided, future workers unable to trace a sheet referred to in the Society's "A Handlist of the Plants of the London Area" should refer to the British Museum.

There has been a measure of re-organization in the Ecology Section which now incorporates the Mammal Group.

The results of the ten-year study of the recolonization of bare gravel areas at Headley Heath have been published. The Bookham Common Survey work of this section has been mentioned above.

Material for a collection of small mammal skins and skeletons in process of formation would be welcomed, as would information and voucher specimens of mollusca in the Society's area.

The Entomology Section make reference to the comparatively poor attendance at their meetings, and express the wish that more exhibits were forthcoming at indoor meetings "as it is felt that they should form a considerable part in an evening's proceedings", an opinion to which all sections would probably subscribe. Recording being an important facet of entomology, plans are being made to add to those lists of insects in the London area already published. It is also hoped to publish a further report of the results of the Stag Beetle Survey, covering the country as a whole.

The Epping Forest Field Section during the year have met twice monthly and are arranging joint meetings with other Sections for 1962. This section usually has only one indoor meeting yearly, the annual general meeting.

Not unnaturally, the Geology Section lay stress on their field meetings, the attendance at which, with one exception, has been better than last year. The Easter Field Meeting, planned so as to be of the widest possible interest, was held in the North Norfolk area, and included visits to Overstrand, where members were shown some of the highest zones of chalk in Britain and also the overlying Weybourne Crag; a coach tour of the Norfolk Broads, and a visit to the Blakeney Point where members were able to see the classic coast formations. Members of the section were also able to see something of the geology between Sheringham and Cromer, where a wide variety of glacial erratics, some believed to have come from Norway and Scotland, was collected.

Members of the section during a field meeting to the Isle of Sheppey found part of the skull of a fish, probably an eel, which although too incomplete for determination appears to be new to the London Clay.

The Ornithology Section meetings have been well attended and a "good flow of new members during the year" is reported.

Work has continued at Beddington Ringing Station and also at Rye Meads under the auspices of the Lee Valley Ringing Group. Members have continued to visit Dungeness Bird Observatory to which the section makes a small financial contribution.

Unique and outstandingly successful was the London migration watch of the autumn of 1960, the early morning watches of many members being well rewarded in interesting bird movement observation.

It is through the medium of the work of the ornithologists that the Society has received useful publicity on radio and television, the London migration watch being the subject of an item on "Nature News"; and in "Town and Around" some excerpts from the Society's London bird film were shown in connection with an appeal for premises for the Society.

The Ramblers' Section, who probably take a broader view of "natural history" than any other, carried out a programme which was at once varied and obviously, from the description given by the section of the places visited, very interesting. Members reading this report will draw their own conclusions from the statement by the Hon. Secretary "The nine Sunday walks of about nine miles on each occasion were mainly in the southern counties."

The South-West Middlesex Group maintain both membership and attendances at indoor and field meetings. To other interesting records submitted they add apropos entomology "a very successful season; twelve species of Lepidoptera, not previously recorded in the area, have been noted, two of which are of particular interest (the Pine Hawk Moth and the Essex Skipper).

In the reports submitted to their annual general meetings most sections give brief details of talks given during the year which have been outstanding, either from the point of view of their importance to the practical work of the section or as contributions to the Society's work by visitors, many of whom are distinguished scientists.

Space does not permit these descriptions, brief though most of them are, to be reproduced here. Every member of the Society will know, however, that the shortest talk on any subject requires far more time in preparation than delivery, and it is in the light of this knowledge, known at first-hand by many members, that the Society wishes to express its gratitude to those many naturalists, professional and amateur, who willingly accept commitments to address the several sections.

LONDON'S BIRDS

The Society's film "London's Birds" will be completed during the ensuing breeding season and will be presented at the Assembly Hall, St. Pancras Town Hall, from March 26 to 29, 1963. The Council is confident that all members of the Society will take the opportunity of seeing this valuable piece of work carried out by some of their fellow members.

Nature Conservation

1961 has been a quiet year for the Conservation Committee. This placidity may, perhaps, be due to an apparent reduction in the number and seriousness of threats to our conservation areas, but is more likely

to be the result of increased activity of other societies and of the County Naturalists' Trusts in our area, combined with the usual apathy of our members, at least towards this Society's conservation needs.

The constitution of the naturalists' trusts does not legally permit membership by a society, but support is given to the neighbouring trusts by our Society paying the subscriptions of the County Representatives on our Conservation Committee, who then become representative members of the appropriate county trusts. It is most satisfactory to note that there appears to be every prospect of the early formation of a Hertfordshire and Middlesex Naturalists' Trust. Members are urged to join their county trusts and to give them their active as well as financial support.

The Conservation Corps of the Council for Nature has increased its week-end activities within the Society's area and a few of our members take part regularly. Places visited this year included Epping Forest, Perivale Wood, Harefield Pit, Wormley Wood, Bricket Wood, Chorley Wood, Box Hill and Bookham Common. Kent has not yet been visited.

Turning to Middlesex, the Society was consulted by the Nature Conservancy about tree thinning at the edge of Whitewebbs Park and gravel extraction in the south west corner of Syon Park. It was decided that, from the naturalists' point of view, no objection could be made to either of these developments. Mrs. McMullen reports that the past year in S.W. Middlesex has seen the completion of the Staines By-Pass and the beginning of work on the Radial Road crossing Osterley Park and Cranford Park. Both projects were planned many years ago and it will soon be possible to see what effect the two roads will have on their surroundings.

Gravel winning is still a problem in this area, but local residents, who are most affected by it, vigorously fight each application for permission to dig gravel. One aspect of this battle is causing great disquiet, especially in the Shepperton area. As soon as one appeal is disallowed by the Minister, the Gravel Companies apply again almost immediately, so that no final decision ever seems to be reached.

Some of the Gravel Companies, worried no doubt by the opposition to their activities, have been trying to improve their relationship with the public. They are improving the appearance of some of their pits by the planting of trees and shrubs. Most of these are of an ornamental nature, but they might be persuaded to increase the variety of subjects if it were considered advisable to approach them on the matter.

To sum up, 1961 has been a period of comparative calm in S.W. Middlesex and, as most activity is detrimental to nature conservation in this part of the county, this is something to be grateful for.

Miss Woods (for Essex) reports that the Corporation of London are proposing to prohibit the turning out of animals on common land in Epping Forest, unless tethered to prevent wandering. A deer sanctuary has been established on the edge of the Forest, at Birch Hall, Theydon Bois, where 80 acres have been wired off and deer leaps provided. Naturalists in many parts of the country have expressed concern at the shooting of birds and mammals, as well as scaring people, by young hooligans with air-guns. Much trouble has been caused in Epping Forest and the neighbouring towns, and plain-clothes detectives have had to be called in to deal with the problem.

Professor Warmington has little to report about Hertfordshire, where local societies are watchful and active. Watford, and less so, Hertford are still great danger spots because of their tendency to spread. The

latest news is that, unless something exceptional happens, a big new road, the Hendon Motorway will shortly be started from Five Ways Corner near Hendon and passing through Mill Hill, it will then turn westwards past Edgware and Elstree, to link up with the M.1 road near Aldenham. It appears that such a road is needed, but although its route is a matter of some controversy, there will be no public enquiry.

Mrs. Side states that nothing has been reported in the Kent part of our area. The Kent Naturalists' Trust has work in hand at Darwin's Bank and Ruxley Gravel Pit; the activity of this trust may account for the absence of visits from the Conservation Corps.

In Surrey, there is rather more activity to report. The development of Fetcham Mill Pond by the East Surrey Water Co. has started. The eastern half of the pond has been bulldozed and work has begun on the enclosure of the spring pits. Discussions have taken place between the water company and the Nature Conservancy on the problems of the transplanting of the Mare's Tail, *Hippuris*, the maintenance of the marginal Reed Grass (*Glyceria*) swamp and the maintenance of the islands and their shrubs as nest sites for water fowl. It is to be hoped that these discussions will result in retrieving something useful from the virtual destruction of the site. At the request of the Chairman of the Leatherhead Planning Committee, your Conservation Secretary visited the Leatherhead Engineer and Surveyor and studied, with him, the company's plans for the development of the pond, in the hope of finding a way of preserving the site of the old water-cress beds as reserve for aquatic birds. Unfortunately, this had to be considered impracticable, owing to the impossibility of providing water to maintain an aquatic habitat. The water for the cress beds formerly came from the spring pits overflow, which will now be diverted to augment the public supply.

Concern was expressed by a member at the proposed filling in of the disused clay pits of the old Oxshott Brickworks, and the Committee's Chairman visited the site in his company. The Esher Council proposed to acquire the whole of the brickworks with a view to filling up the pit and incorporating the land with Littleheath Common. In view of the intense demand for tipping space, the great depth of water which would inevitably accumulate in the absence of pumping and of tipping and the public benefit of an additional public open space, it was not felt reasonable to oppose the proposed development of the brickworks.

The reed bed at Black Pond, Esher Common, has been left completely untouched during the dredging operations and recolonization by reeds is already taking place in the disturbed area. It is thought that the deeper water will prove more attractive to birds in winter than formerly. The rapid growth of the sedge *Scirpus fluitans* is causing trouble and the Surrey Trust is obtaining advice on control measures for the Engineer and Surveyor of the Esher U.D.C.

The Nature Conservancy sought the Society's opinion on an application to clear-fell some 20 acres in the S.W. corner of Ashted Wood, the land then to be reclaimed for agriculture. The site appears to be just outside the public part of Ashted Common. The Conservancy was urged to recommend thinning and clearing, rather than clear-felling, and replanting so as to maintain the woodland character. It was pointed out that subsequent development of the land for building would be made easier by the removal of the trees. However, according to the Local Authority, there is no danger of building development, as the land is scheduled as part of the Green Belt.

C. P. CASTELL, *Conservation Secretary.*

Botanical Records for 1961

Compiled by J. EDWARD LOUSLEY

BOTANICAL work in the London Area suffered little handicap from the weather in 1961. Throughout the summer there was adequate moisture for plants and no extended excessively hot periods. February and March were the only really exceptional months, and these were so warm that reports started to come in long before the usual time. At Kew it was the mildest February on record. On the 14th the temperature rose to 65°F, and in early March day temperatures rose to the 70's. With so much warmth it is perhaps not remarkable that R. Clarke was able to report, for example, Soft Comfrey, *Symphytum orientale*, in flower on 1 March at Warlingham, while on the 17th I noted at Streatham hawthorn and Horse Chestnut in full leaf, and cherry and pear in flower. As serious frost was delayed until well into November, our season was a very long one.

More records were contributed in 1961 than in any previous year, though their distribution over our Area showed no improvement. More than half came from Surrey, followed by Kent and Middlesex, with a poor response from the other counties. A welcome trend is again in the increase of fern records, partly due to the steady recovery of the plants from the depredations of earlier generations who dug them up for their gardens, and partly to the much greater interest in ferns which is being shown by present workers. The most valuable aspect of the year's records is their contribution to filling in the detailed pattern of the distribution of native species for which many new localities have been added. Of rarities the outstanding discovery was Roman Nettle at Wandsworth—it is just sixty years since this was last reported for our area. Bithynian Vetch at Blackheath was almost as unexpected. In central London the disturbances caused by roadmaking have provided ground on which interesting plants have been able to grow on the edges of Hyde Park and Green Park, and D. E. Allen and D. McClintock have contributed useful records from here.

Last year we suffered confusion and frustration due to deliberate planting of roots in wild situations, but during 1961 no definite cases of doubt about the value of records for this reason came to our notice. We are informed, however, that Military Orchids, *Orchis militaris*, have been transplanted from France to the Otford area and these may cause confusion at a later date.

The nomenclature used in this report is based on the *List of British Vascular Plants* (1958) prepared by J. E. Dandy, and for species in that list authors' names are omitted in order to save space. The numbers following place names are those of the 10-kilometre squares of the National Grid (for a full explanation see *Lond. Nat.*, 37, 182, 1958).

V.-C. 16, WEST KENT.

From Woolwich Common (47), G. Brown reports Bithynian Vetch, *Vicia bithynica* which was confirmed by D. McClintock. This is the first time this species has been included in our records of the London Area. Equally interesting is W. G. Teagle's discovery of about 30 patches of Subterranean Clover, *Trifolium subterraneum*, at The Paragon, Blackheath (37). This species was first recorded from Blackheath over 150 years ago.

The records contributed by K. White include a report on the colony of Lady Orchids, *Orchis purpurea*, near Halstead (46) which appears to be

increasing. In 1961 there were 14 plants, of which only one flowered. In Bourne Wood (46) Mr. White found Butcher's Broom, *Ruscus aculeatus*, and in Oxleas Wood (47) in a recently cleared area he saw small plants of Daffodils, *Narcissus pseudo-narcissus*, "similar to those in Abbey Wood not far away". Records of wild daffodils from this district date back a long way and it is pleasing to add a new station.

H. M. Pratt sent in his usual useful list, and this included two species new to our records for West Kent:—a Parsley Piert, *Aphanes microcarpa*, determined by F. H. Perring, from Stone House grounds (57), and *Valerianella dentata* from near Darenth Wood (57). Also new to this part of our Area are *Polygonum minus* found by F. Rose in 1960 on Chislehurst Common (47), and a grass, *Lolium rigidum* Gaud., found by D. McClintock on a rubbish-tip at Stone (57). H. A. Sandford reports Narrow-leaved Everlasting Pea, *Lathyrus sylvestris*, from a recently abandoned chalk-pit in Swanscombe, which is a mile or so from the well-known locality in Swanscombe Wood. It is interesting that he reports a single bush of Cut-leaved Elder, *Sambucus nigra* var. *laciniata* Mill. from the path by the Ebbsfleet in Northfleet (67) since this may well be the same bush that was found by P. H. Cooke in 1938.

Records contributed by R. Clarke include Angular Solomon's Seal, *Polygonatum odoratum*, confirmed by F. Rose, from Betsom's Hill, Westerham (45), and *Arium italicum* from French Street (45). Also an eyebright, *Euphrasia anglica*, confirmed by D. P. Young, and Pale Toad-flax, *Linaria repens*, both from Biggin Hill (45). In Chevening Park (45) he noted Snowdrop, *Galanthus nivalis*, at Greatness, near Sevenoaks (55) a St. John's-wort, *Hypericum* × *desetangsii*, determined by D. P. Young, and from Westerham Hill (45), *Polygonum sachalinense*.

V.-C. 17, SURREY

The occurrence of Roman Nettle, *Urtica pilulifera*, in the London Area after a gap of 60 years in the records was the outstanding report of the year. Although never "native" in this country, this is a traditional "British species" included in all the standard floras but treated as extinct. It was found as a weed in a garden at West Hill, Wandsworth. (27) by Ian C. Price in 1960, and the following year there were at least 5 plants when he took a specimen to Kew for confirmation. Exhaustive enquiry has failed to reveal an explanation of how it came to be there, and although there are two very old records for Wandsworth it seems that both these were from near Wandsworth Pier which is a long way from the new place.

A pleasing rediscovery was Small-flowered Crowfoot, *Ranunculus parviflorus*, in the Hallelu Valley, Warlingham (35). This was found by Dr. J. P. S. Robertson and confirms a record by A. Beadell in 1923. Equally welcome was the reappearance of Small Fleabane, *Pulicaria vulgaris*, in an old locality at Esher (16) where R. A. Boniface found a few plants this year. Mrs. P. Dawe has added a new hybrid to our list from near Pebblecombe Hill (25). This is a cross between Druce's Marsh Orchid, *Dactylorhiza praetermissa*, and Fragrant Orchid, *Gymnadenia conopsea*—a dried specimen was seen by V. S. Summerhayes, and later Mrs. Dawe sent a sketch she had made of the plant when it was fresh which confirmed the identification. The evening primroses growing at Walton Common (06) for so many years have long been puzzling, and we are fortunate that D. Philcox took advantage of the visit of Dr. P. H. Raven to this country

to obtain his determination of material from there as *O. parviflora* and *O. erythrosepala*.

The very welcome increase in fern records has already been mentioned, and a good example is Soft-Shield-fern, *Polystichum setiferum* which Mrs. J. E. Smith found on Arbrogath Common (16) and R. Clarke at Castle Hill, Bletchingley, Owls Wood, Chelsham, Chaldon, Titsey Plantation, Caterham Tupwood, and Tilburstow Common (all 35). Narrow Buckler fern *Dryopteris lanceolatoeristata* he found at Henley Wood (35), Selsdon Wood (36) and Walton-on-the-Hill (25), and he refound Hard fern, *Blechnum spicant*, at Moorhouse, near Limpsfield (45) where it was recorded by R. W. Robbins in 1917. Borrer's male fern, *Dryopteris borrieri*, is a rare fern near London—Mrs. Smith found it in Sandy Lane, Oxshott (16) and R. Clarke in Penduck Shaw, Bletchingley (35). Water fern, *Azolla filiculoides*, was seen by Miss B. A. Kneller in a pond at Bletchingley (35), and Mrs. B. Welch found a pond covered with it in Ashted Park (15).

Greater Woodrush, *Luzula sylvatica*, is another species for which there has been a sudden influx of records though there is a possibility that it may sometimes be planted. R. Clarke reports it from Tilburstow Common, and Penduck Shaw, Bletchingley (both 35) and D. C. Kelly from Chiphouse Wood, Chipstead (25). The latter also found Tall Broomrape, *Orobanchae elatior*, in quantity in fields east of Farthing Downs (35) where it appeared quite suddenly, and *Lychnis chalcidonica* L. well established and increasing in Greystone Limeworks, Merstham (25). Two interesting records from inner London are a grass, *Koeleria phleoides* (Vill.) Pers., growing on the steps under Festival Hall, South Bank (37) found by D. E. Allen, and Annual Mercury, *Mercurialis annua*, from near Lambeth Town Hall, Brixton (37) found by P. C. Holland. Miss B. M. C. Morgan sent a specimen of a wintercress, *Barbarea intermedia*, from opposite the Jolly Farmers, Buckland (25) from which locality it was reported last over 30 years ago, and she took me to see a most interesting colony of *Buddleja davidii* in an old pit at Greystone Limeworks, Betchworth (25). Here forms similar to those commonly established grew with plants with drooping branches, much branched panicles, and narrow leaves which B. L. Burtt of the Royal Botanic Garden, Edinburgh, suggests come under var. *nanhoensis* (Chitt.) Rehder.

Mrs. J. E. Smith reports an uncommon sedge, *Carex echinata*, a grass, *Nardus stricta*, and Creeping Willow, *Salix repens*, from Oxshott Heath (16), and Many-stemmed Spike-rush, *Eleocharis multicaulis*, found at Black Pond, Esher Common (16) on one of our field meetings led by her. In September a piece of a handsome blue-flowered nightshade, *Solanum sisymbriifolium* Lam. was sent to the Royal Horticultural Society at Wisley for identification from near some newly built houses at Fairmile Park, Oxshott (16). Mrs. Smith succeeded in refinding this from very vague directions and showed it to J. C. Gardiner and myself. The seed may have been introduced with building materials, and near it grew a single plant of English Catchfly, *Silene anglica*, which is rare. On Littleworth Common (16), R. A. Boniface found a sedge, *Carex binervis*, Meadow Thistle, *Cirsium dissectum*, and a rush, *Juncus kochii*. The latter is closely allied to *J. bulbosus*, and although the two species can be separated without difficulty elsewhere in Britain we are finding it hard to separate them in the London Area and further records are required.

The records contributed by Mrs. B. Welch include an unusual form of a hybrid sedge, *Carex* \times *pseudoaxillaris*, named for her by Miss S. S. Hooper, and found near the Ham Gate, Richmond Park (17), and Floating Clubrush, *Scirpus fluitans*, from the Island Pond, Ashted Park (15). I was pleased to find a fumitory, *Fumaria micrantha*, in plenty in a barley field near Mitchley Wood (36), and a gentian, *Gentianella anglica*, on the railway bank near Riddlesdown Station (36) and in a new place (36) as well as the old one (35) on Riddlesdown itself. An alien crucifer, *Bunias orientalis*, is still increasing on downland and I noticed it near Mitchley Wood (36), and a fine colony on Riddlesdown (36), while R. Clarke reports it from Whyteleaf tip (35). An interesting letter from Miss M. M. Fryer draws attention to Dyers' Greenweed, *Genista tinctoria*, near Oaken Wood, Little Bookham (15) just outside our Area. It is now confined to small clumps along the sides of the footpath, but before the War was abundant over a large area which has been ploughed and cultivated.

By far our largest contribution of useful Surrey records this year came from R. Clarke and some of these have already been mentioned. He also reports Herb Paris, *Paris quadrifolia*, from Titsey Wood (45), Armitage Wood (35) and Chalkpit Wood (35), a sedge, *Carex laevigata*, confirmed by Dr. D. P. Young, from Hurst Green (35), and a stonewort, *Chara vulgaris*, Fennel-leaved Pondweed, *Potamogeton pectinatus*, and Hybrid Watercress, *Rorippa* \times *sterilis*, determined by Dr. Young from a pond at South Park, Bletchingley (34) on the edge of our Area. He draws attention to the spread of seedlings of Norway Maple, *Acer platanoides*, at Marden Park (35) and Walton Downs (25). In 1960 he gave me directions to a remarkable thicket of bamboos at Crab Apple Copse (34) which I visited this year. Two species, *Sasa senanensis* (Franch. & Sav.) Rehder and *Arundinaria anceps* Mitford, no doubt owe their origin to deliberate planting with exotic trees but their persistence and spread owes nothing to human care, and it seems that they are now thoroughly established. Two tips provided interesting lists. From the Foster Down tip, Godstone (35), Mr. Clarke reports Henbane, *Hyoscyamus niger*, a vetch, *Vicia villosa* (det. Dr. Young), Night-flowering Catchfly, *Silene noctiflora*, and Fuller's Teasel, *Dipsacus sativus*. From the Nore Hill tip (35) he had an even longer list including:—Reversed Clover, *Trifolium resupinatum*, a vetch, *Vicia pannonica*, Twiggy Mullein, *Verbascum virgatum*, Flixweed, *Descurainia sophia*, Yellow Chamomile, *Anthemis tinctoria*, and *Potentilla norvegica*. There was also a plant of Black Mulberry, *Morus nigra* L. of a height which led Dr. C. T. Prime to suggest that it may have come from a seed which germinated during the hot summer of 1959.

V.-C. 18, SOUTH ESSEX

No additional species have been reported for our records for this vice-county but A. W. Rudiger found Fyfield Pea, *Lathyrus tuberosus*, at Whipps Cross (38), W. G. Teagle found Strawberry Clover, *Trifolium fragiferum*, on clay in Green Lane, Sewardstone (39), and Mrs. L. M. P. Small reports a few plants of Ramsons, *Allium ursinum* in Gilwell Lane (39).

V.-C. 19, NORTH ESSEX

Three additions to our records for this vice-county have been made by B. S. Nau for species observed in 1960—Creeping Restharrow, *Ononis*

repens from Hall's Green (40), Lesser Reedmace, *Typha angustifolia*, from Nazeingbury (30) and Fishers Green (39), and Water Chickweed, *Myosoton aquaticum*, from the River Stort at Roydon (41) (the vice-county boundary here is complicated but this is confidently given as from Essex). Another addition is Golden Dock, *Rumex maritimus*, recorded by B. T. Ward from a water-filled gravel pit at Fishers Green (30) in 1959 (*Essex Nat.*, 30, 267).

V.-C. 20, HERTFORDSHIRE

The records contributed by P. Knipe for plants found in 1960, include *Montia perfoliata* from near Grove Cottage, Bushey Heath (19), a knot-grass, *Polygonum rurivagum*, from a chalky arable field at Church End, Sarratt (09), and Solomon's Seal, *Polygonum multiflorum*, as a hortal outcast from near The Fold, Sarratt (09). J. G. Dony reports Blunt-leaved Pondweed, *Potamogeton obtusifolius*, from Aldenham Reservoir (19) and near Northaw (20), and, with D. H. Kent and J. B. Souster, Fennel, *Foeniculum vulgare*, from a disused rubbish tip at Bushey Heath (19). B. S. Nau's records (again for 1960) include Wood Club-rush, *Scirpus sylvaticus*, from Broxbourne Woods (30), Meadow Cranesbill, *Geranium pratense*, from Hoddesdonbury (30), and Mistletoe, *Viscum album*, from Woolmers Park (21) and Balls Park (32). A medick, *Medicago polymorpha*, was found on a rubbish tip at Rickmansworth (09) by C. A. Stace.

V.-C. 21, MIDDLESEX

Interesting features of the Middlesex records this year have been the spread of aliens, and the occurrence of uncommon plants in central London. Dittander, *Lepidium latifolium*, which is an alien in our Area, has increased spectacularly since it was first noticed at Rickmansworth in 1937. D. H. Kent has now found it on the canal bank near Uxbridge (08), and on a canal bank at Frogmore Green, near Southall (17), which are considerable extensions of range from the enormous colonies now established at Springwell and Harefield. Similarly with Hoary Mustard, *Hirschfeldia incana*, which was reported in 1954 in quantity on a rubbish tip at Hounslow Heath, and as a single plant at Hanwell: D. H. Kent now says that it is spreading on to Hounslow Heath proper from adjacent waste ground where it is profusely abundant, and he finds it in several places on the canal path between Hanwell and Brentford (all 17). He also points out that the waterweed *Elodea callitrichoides*, well known in the Longford River at Stanwell since 1950, now occurs sparingly in the same river at Hanworth (17) doubtless carried down in the stream.

During the summer the considerable areas of disturbed ground in Hyde Park and Green Park caused by the extensive road reconstruction work centred on Hyde Park Corner, provided a rich harvest to D. E. Allen and D. McClintock. In Green Park, by Piccadilly (27), they found Hemlock, *Conium maculatum*, Tumble Mustard, *Sisymbrium altissimum*, and a rare alien grass which comes in with bird-seed, *Monerma cylindrica* (Willd.) Coss. & Dur. In Hyde Park (28) the plants they found included Red Sand Spurrey, *Spergularia rubra*, Prickly Ox-tongue, *Picris echioides*, Foxglove, *Digitalis purpurea*, Beaked Hawk's-beard, *Crepis vesicaria* subsp. *taraxacifolia*, and three nice grasses, *Apera spica-venti*, *Vulpia bromoides* and *Poa palustris*. It is interesting that this is the second record for the last mentioned grass from Hyde Park—it was found there on an

air-raid shelter in 1944. P. Knipe reported Ivy-leaved Toadflax, *Cymbalaria muralis*, as found on a wall at the corner of Bedford Row and Theobald's Road (?28) in 1960. On a disused railway line at Muswell Hill (28), E. B. Bangerter and P. H. Raven found a hybrid willow-herb, *Epilobium adenocaulon* × *montanum*, det. P. H. Raven, new to our List, and also a hawkweed, *Hieracium aurantiacum*, det. P. D. Sell and C. West. One of the lawn weeds which have been attracting a lot of interest recently, *Cotula dioica* L., was found as an irradicable pest in a lawn at Fordington Road, Highgate (28) by C. E. Marks, and named by D. H. Kent.

Miss Hilary Perkins (aged 12) reports Fritillaries, *Fritillaria meleagris*, in the grounds of a derelict mansion at Eastcote (18) where "every year children go and pick them". This species occurred formerly in a number of places in this part of Middlesex, and it is possible that this locality is a relict one. In the same grounds she found *Allium paradoxum* (which resembles a "white" bluebell and smells strongly of garlic), a garden plant becoming increasingly established in many parts of Britain. Mrs. L. M. P. Small sent me a specimen of a giant dock, *Rumex patientia*, from by A.110 between Ponders End Lock and King George's Reservoir (39). This is already known from several places in the Lea Valley on the Essex side, but this is the first time it has been reported so far north and on the Middlesex side of the valley. Professor E. Warmington records Bloody Cranesbill, *Geranium sanguineum*, in small quantity from Bentley Priory (19) where no doubt it is a garden outcast. In 1960, P. Knipe found Cypress Spurge, *Euphorbia cyparissias* at Harrow Weald (19) and *Asperula arvensis* in a garden at Rayner's Lane (18) where it was probably introduced with bird seed. We are grateful to D. Philcox and C. C. Townsend for reports of a number of garden aliens from a rubbish tip at Hounslow Heath (17), and French Tamarisk, *Tamarix gallica*, is reported from the edge of a rubbish tip at New Years Green (08) where T. G. Collett found a single large bush in 1960 which was seen by D. H. Kent last year. Finally, in the Inner Circle in Regent's Park (28) A. B. Knight noticed a Horse Chestnut, *Aesculus hippocastanum*, on 10 September with next year's "candles" in full bloom on about a third of the tree on the side facing south-west.

V.-C. 24, BUCKINGHAMSHIRE

The only record received during the year was for Star-of-Bethlehem, *Ornithogalum umbellatum*, found by P. Knipe in 1960 in Crosslane Wood, Chalfont St. Giles (09).

We are grateful to the following for records contributed during the year:—D. E. Allen, E. B. Bangerter, R. A. Boniface, G. Brown, B. L. Burt, R. Clarke, T. G. Collett, Mrs. P. Dawe, Dr. J. G. Dony, Miss M. M. Fryer, J. C. Gardiner, P. C. Holland, Miss S. S. Hooper, D. C. Kelly, D. H. Kent, Miss B. A. Kneller, A. B. Knight, P. Knipe, J. E. Lousley, D. McClintock, C. E. Marks, Miss B. M. C. Morgan, A. F. Mussellwhite, B. S. Nau, Dr. F. H. Perring, Miss Hilary Perkins, D. Philcox, H. M. Pratt, Ian C. Price, Dr. C. T. Prime, Dr. P. H. Raven, Dr. J. P. S. Robertson, Dr. F. Rose, A. W. Rudiger, H. A. Sandford, P. D. Sell, Miss L. M. P. Small, Mrs. J. E. Smith, J. B. Souster, C. A. Stace, V. S. Summerhayes, W. G. Teagle, C. C. Townsend, B. T. Ward, Prof. E. Warmington, Mrs. B. Welch, Dr. C. West, K. White, Dr. D. P. Young.

A Survey of *Calystegia* in the London Area

TWO species of *Calystegia* are native to Britain—*C. sepium* (L.) R. Br., the Hedge Bindweed, a common feature of hedges, ditches, marshes and waste ground, and *C. soldanella* (L.) R. Br., Sea Bindweed, a plant of sandy and shingly seashores, which is not found in the London area. A third species, *C. silvatica* (Kit.) Griseb., from south-east Europe, was introduced into Victorian gardens as an ornamental climber, and now occurs widely on waste ground, and in hedges, as an escape or outcast. In addition pink-flowered forms of both *C. sepium* and *C. silvatica* are found, and it is possible that one, or more, distinct pink-flowered species also occur as garden escapes.

Both *C. sepium* and *C. silvatica* are common in the London Area, and it has been decided to invite members to take part in a survey in which an attempt is to be made to work out the distribution of the two species in the Area. This is not such a simple matter as it would first appear, as whenever the two species meet they readily cross, producing the hybrid *C. X lucana* (Tenore) G. Don: this hybrid is just as fertile as its parents, with which it freely backcrosses. Thus, hybrid swarms covering the whole range of variation from extreme *C. sepium* to extreme *C. silvatica* exist, making it impossible to produce a reliable key to the identification of the two species and their progeny.

C. A. Stace has used simple statistical methods to separate the two species and their hybrids in the Tunbridge Wells Area, and he has kindly given details of these methods, which we intend to use in the London Area, and which are outlined on the individual record cards. (See also Stace in *Watsonia*, 5, 88, 1961.)

The following brief descriptions may be of assistance, but it must be emphasized that all measurements are subject to fluctuation, probably due to "concealed hybridity".

Calystegia silvatica. Plant large in most of its parts; bracteoles broadly ovate, obtuse to truncate and mucronate, inflated, and wrapped around the flower obscuring the sepals. Corolla 58-82 mm. long; white, often flushed with pink on the veins; stamens c. 23-26 mm.; style + stigma 24-28 mm.; flattened out bracteoles 27-45 mm. wide.

C. sepium. Plant smaller in most of its parts; bracteoles ovate, acute to obtuse \pm flat and scarcely wrapped around the flowers so that the sepals are visible in side view. Corolla 36-55 mm. long; white; stamens c. 17-18 mm.; style + stigma 16-19 mm.; bracteoles 10-18 mm. wide when flattened out.

C. X lucana. Plant intermediate in all characters. Corolla 41-62 mm. long; white, often suffused with pink on the veins; stamens 20-21 mm.; style + stigma 20-23 mm.; width of flattened out bracteoles 21-45 mm.

Care should be taken not to record *Convolvulus arvensis*, Corn Bindweed. This very common species differs from *Calystegia* by having small bracteoles which do not overlap the calyx, and a corolla which is rarely more than 20 mm. long.

I am indebted to C. A. Stace for assistance in compiling these notes.

D. H. KENT.

Additions and Corrections to the Flora of Central London

Compiled by DOUGLAS H. KENT

SINCE the publication of "A contribution to the Flora of Central London" (Kent, 1960) a number of additions have been made—both in taxa new to the area and in new localities for species previously reported.

An anonymous article in *The Times* of November 3, 1960, drew attention to the occurrence of a number of bird-seed aliens in Green Park, Piccadilly. This "colony" was first noticed by Lady Anne Brewis in the autumn of 1960, and subsequent investigation by D. McClintock revealed a number of interesting species, some of which were referred to in *The Times* article. A mention of this unusual "colony" was also made in the *Wild Flower Magazine* (McClintock, 1961).

The "bulldozing" of sections of Hyde Park in connexion with the Park Lane-Hyde Park Corner and Marble Arch improvement schemes has provided much suitable ground for the germination of adventive propagules, and will probably continue to do so for several years. This fruitful area has been carefully studied by D. E. Allen with excellent results; Lady Anne Brewis, D. McClintock, Miss R. Rönaasen and the compiler also visited the area.

The arrangement of the list that follows is similar to that of Kent (1960) and the nomenclature is again based on that of Dandy (1958). English names, frequency, etc. are given only for taxa additional to those listed by Kent (1960). The following signs are used:—

- * Plant merely casual.
- † Plant of foreign or cultivated origin.
- ‡ Following a locality indicates that the plant has been seen there by the compiler; ‡ following a recorder's initials indicates that the record was made in the company of the compiler.
- § Plant additional to the list given by Kent (1960).

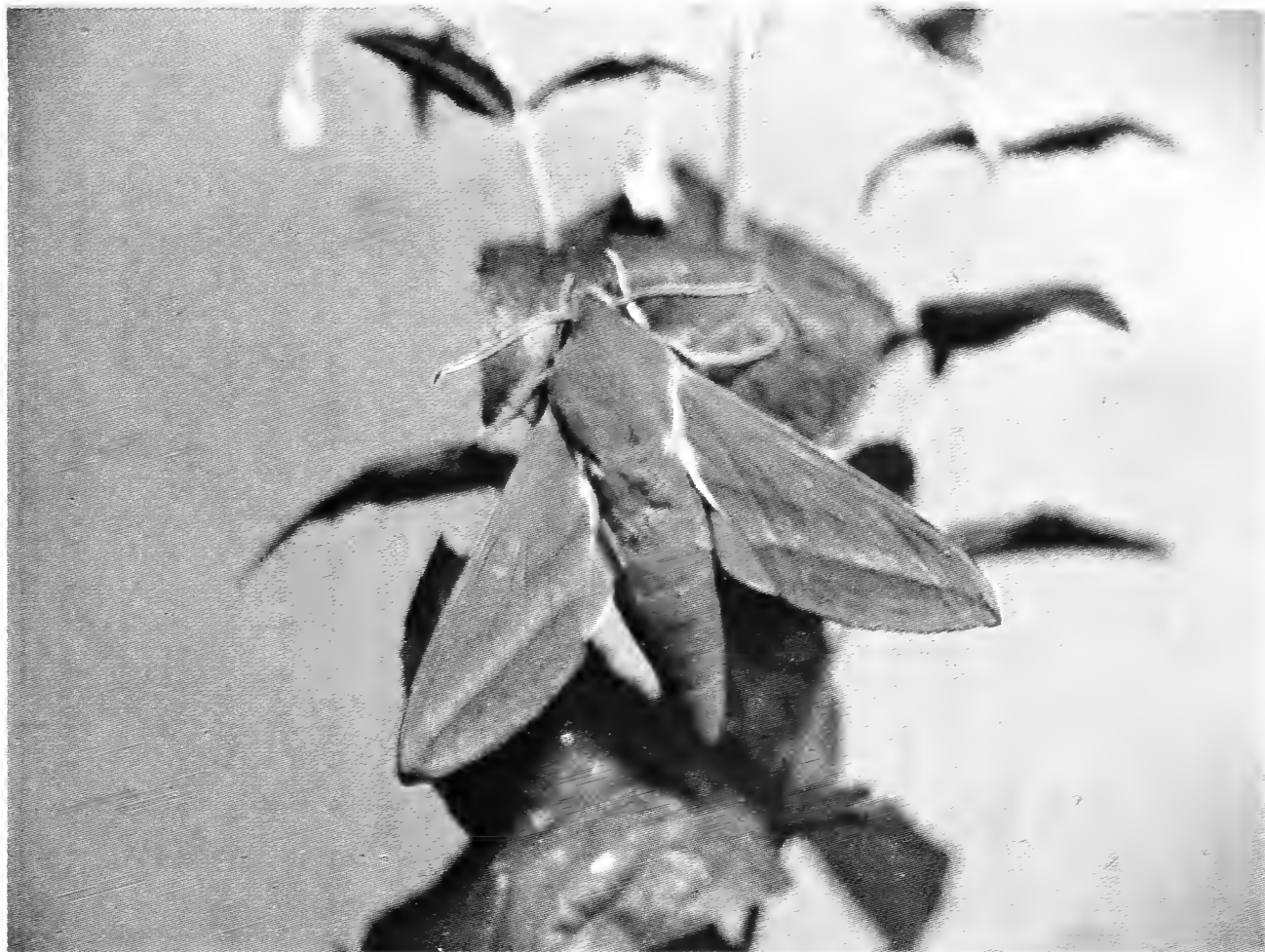
I am once more indebted to the friends and correspondents who have provided records, and especially to D. E. Allen, Lady Anne Brewis and D. McClintock. The first and last named also kindly read and commented upon the typescript of this paper.

The bird-seed alien locality in Green Park is referred to throughout this paper as "Piccadilly".

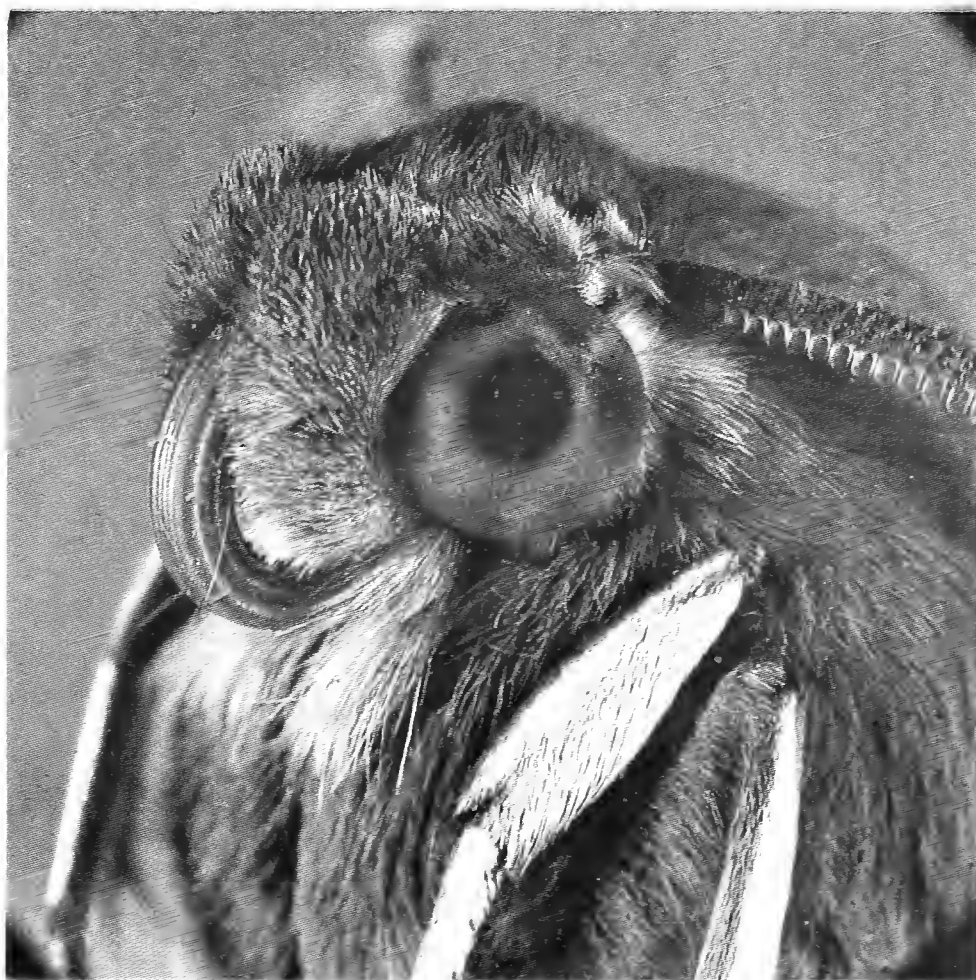
In a number of cases plants were reported independently from the same locality by more than one recorder. In such cases the recorders' initials are given in alphabetical order separated by a semi-colon. Records not followed by a recorder's initials were made by the compiler who would be glad to receive additional records from the area.

INDEX TO NAMES OF RECORDERS AND SPECIALISTS

A.Br.	Brewis, Lady Anne	J.E.L.	Lousley, J. E.
A.E.	Eliot, Lady Alethea	L.J.T.	Tremayne, L. J.
A.M.	Melderis, Dr. A.	P.D.S.	Sell, P. D.
B.M.	Miles, B.	P.R.K.	Knipe, P. R.
B.W.	Welch, Mrs. B.	R.R.	Rönaasen, Miss R.
D.E.A.	Allen, D. E.	S.C.	Cramp, S.
H.C.H.	Holme, H. C.	W.J.L.S.	Sladen, Dr. W. J. L.



Deilephila elpenor *Linn.*



ASPLENIACEAE

PHYLLITIS SCOLOPENDRIUM (L.) Newm. Under coal-hole cover,
3 Upper Belgrave Street, S.W.1, 1961, D.McC.

FUMARIACEAE

*FUMARIA OFFICINALIS L. Kensington Gardens, 1961, D.E.A.

CRUCIFERAE

§*†BRASSICA OLERACEA L. *sensu lato*. Cabbage. Piccadilly, 1960, D.McC.

§*†B. RAPA L. Turnip. Hyde Park, one plant, 1958, D.E.A.

DIPLOTAXIS TENUIFOLIA (L.) DC. Railway side outside Victoria, 1961;
Battersea, D.McC. Railway side near Paddington, 1961.

*RAPHANUS RAPHANISTRUM var. FLAVUS Schub. & Mart. Hyde Park,
1960, D.E.A.; 1961, D.E.A. and D.McC.

*†LEPIDIUM RUDERALE L. Regents Park, 1961, H.C.H.

CORONOPUS SQUAMATUS (Forsk.) Aschers. Lord's Cricket Ground,
1960-62.

†C. DIDYMUS (L.) Sm. Lord's Cricket Ground, 1960.

†ARMORACIA RUSTICANA Gaertn., Mey. & Scherb. Victoria, 1961,
D.McC. Hyde Park, D.E.A.

CARDAMINE HIRSUTA L. "Kensington Gardens" (Kent, 1960) should
read "Hyde Park, 1958".

RORIPPA ISLANDICA (Oeder) Borbás. Railway tracks, Paddington,
1961.

*†HESPERIS MATRONALIS L. Hyde Park, 1961, A.Br.; D.E.A. and D.McC.

ERYSIMUM CHEIRANTHOIDES L. Eaton Square, S.W.1, 1960-61, D.McC.
Hyde Park, D.E.A.

‡SISYMBRIUM OFFICINALE var. LEIOCARPON DC. Hyde Park, 1960,
D.E.A.‡

*†S. ORIENTALE L. Hyde Park, 1961, A.Br. Kensington Gardens, one
plant, 1961, D.E.A.

*†S. ALTISSIMUM L. Piccadilly, 1961, D.E.A. and D.McC.

CAPPARIDACEAE

§†CLEOME SPINOSA L. Giant Spider Flower. S. America. Garden
outcast. Kensington Gardens, several plants on a soil dump,
1961, D.E.A., det. D.McC.

RESEDACEAE

RESEDA LUTEA L. Hyde Park, one abnormal plant, 1960, D.E.A., det.
at KEW.

*†R. ALBA L. Chelsea Square, 1944, W.J.L.S. and D.McC.

VIOLACEAE

*VIOLA ARVENSIS Murr. Kensington Gardens, 1961, D.E.A.

GUTTIFERAE

*HYPERICUM PERFORATUM L. Kensington Gardens, one plant, 1960,
D.E.A.

CARYOPHYLLACEAE

SILENE VULGARIS (Moench) Garcke. Railway bank, Battersea,
D.McC.

S. ALBA (Mill.) E. H. L. Krause. Chelsea, common. Paddington
Green, 1961.

§*STELLARIA GRAMINEA L. Lesser Stitchwort. Very rare. Hyde Park,
two plants on a soil dump, 1961, D.E.A. and D.McC.

§SAGINA APETALA Ard. *Common Pearlwort*. Very rare. Hyde Park, one plant in crevice of pavement beside the fountains, 1961, D.E.A.

§*SPERGULA ARVENSIS L. *Corn Spurrey*. Hyde Park, 1959; Kensington Gardens, 1960, D.E.A.

§*SPERGULARIA RUBRA (L.) J. & C. Presl. *Red Sand-spurrey*. Hyde Park, several plants in two places, 1961, A.Br.; D.E.A. and D.McC.

MOEHRINGIA TRINERVIA (L.) Clairv. Kensington Gardens, 1961 D.E.A.

PORTULACACEAE

†MONTIA PERFOLIATA (Willd.) Howell. For "Albert Embankment Gardens" (Kent, 1960), read "Chelsea Embankment Gardens".

CHENOPODIACEAE

CHENOPODIUM MURALE L. Building site of new Duke of York's Headquarters, Chelsea, 1960, A.Br. Kensington Gardens, 1961, D.E.A.

ATRIPLEX PATULA L. Hyde Park, A.Br.; D.E.A. Chelsea.

MALVACEAE

§†ALTHAEA ROSEA L. *Hollyhock*. S. Europe. Garden escape. Kensington Gardens, 1961; Hyde Park, 1961†, D.E.A.

§*†MALVA PARVIFLORA L. Europe. Kensington Gardens, one plant, 1961, D.E.A. and D.McC., det. D.McC., conf. J.E.L.

LINACEAE

*†LINUM USITATISSIMUM L. Piccadilly, 1960, A.Br. and D.McC.

GERANIACEAE

GERANIUM MOLLE L. Kensington Gardens, 1960, D.E.A.

SIMAROUBACEAE

†AILANTHUS ALTISSIMA (Mill.) Swingle. Victoria, by railway bridge, 1961, D.McC.

LEGUMINOSAE

†MEDICAGO SATIVA L. Regents Park, H.C.H.

†MELILOTUS OFFICINALIS (L.) Pall. Regents Park.

†TRIFOLIUM HYBRIDUM L. St. James's Park, 1939, L.J.T.

§*†PHASEOLUS COCCINEUS L. *Scarlet Runner*. Tropical America. Out-cast from cultivation. Kensington Gardens, one plant, 1961, D.E.A., D.McC. and R.R.

§†LATHYRUS LATIFOLIUS L. *Broad-leaved Everlasting Pea*. S. Europe. Garden escape. Railway bank near Paddington, 1960.

*†PISUM SATIVUM L. Kensington Gardens, 1961, D.E.A., D.McC. and R.R.

ROSACEAE

§RUBUS LACINIATUS Willd. Hyde Park, D.E.A.

R. SEPARINUS Genev. Hyde Park, D.E.A.

POTENTILLA ERECTA (L.) Räusch. D. E. Allen is now of the opinion that the plant recorded from Kensington Gardens (Kent, 1960) was in fact a small-flowered form of *P. erecta* x *reptans*.

§*†FRAGARIA ANANASSA Duchesne. *Garden Strawberry*. Hyde Park, one small plant, 1961; possibly derived from a "pip" from a strawberry eaten by a passer-by, D.E.A. and D.McC.

ROSA DUMETORUM Thuill. Delete Kensington Garden record given by Kent (1960). The bush is planted.

ONAGRACEAE

EPILOBIUM PARVIFLORUM Schreb. Kensington Gardens, one plant, 1961, D.E.A.

UMBELLIFERAE

- §CHAEROPHYLLUM TEMULUM L. *Rough Chervil*. Very rare. Kensington Gardens, 1942. Not seen since.
- †C. AUREUM L. For "1959, J.E.L." (Kent, 1960) read "1950, D.McC."
- §*ANTHRISCUS CAUCALIS Bieb. *Bur Chervil*. Hyde Park, one plant, 1961, D.E.A.; Green Park, 1961, D.E.A. and D.McC.
- CONIUM MACULATUM L. Green Park, Piccadilly, on disturbed ground, 1961, D.E.A. and D.McC.
- CONOPODIUM MAJUS (Gouan) Loret. Regents Park, 1957, B.W. Kensington Gardens, in late mown grass, 1961, D.E.A.
- §*†PASTINACA SATIVA L. *Parsnip*. Kensington Gardens, one plant, 1961, D.E.A.

EUPHORBIACEAE

- EUPHORBIA HELIOSCOPIA L. Eaton Square, S.W.1, 1960, D.McC.

POLYGONACEAE

- POLYGONUM AMPHIBIUM L. Kensington Gardens, one patch by the Serpentine, 1961, D.E.A.
- §*P. NODOSUM Pers. Hyde Park, 1961, A.Br.
- §*P. HYDROPIPER L. *Water Pepper*. Hyde Park, one large plant on a dump of soil, 1960, D.E.A.; 1961, A.Br. Kensington Gardens, 1961, D.E.A.
- §†P. SACHALINENSE F. Schmidt. Sakhalin. Garden outcast. Hyde Park, two plants, 1961, D.E.A. and D.McC. Chelsea Hospital grounds, D.McC.
- RUMEX ACETOSELLA L. Paddington Green. Railway tracks, Paddington, 1961.
- §R. TENUIFOLIUS (Wallr.) Löve. Very rare. Kensington Gardens, turf near the Serpentine, 1960†, D.E.A., conf. J.E.L. Hyde Park, waste ground near Hyde Park Corner, 1961, D.E.A.
- R. SANGUINEUS var. VIRIDIS Sibth. Hyde Park, plentiful in the Bird Sanctuary, D.E.A. All records given by Kent (1960) refer to var. *viridis*.
- PARIETARIA DIFFUSA Mert. & Koch. Garden weed, St. Marylebone, 1961, H.C.H.

CANNABIACEAE

- URTICA DIOICA L. Hyde Park, A.Br.; D.E.A. Green Park, D.McC.
- *†CANNABIS SATIVA L. Manresa Road, S.W.3, c. 1956, A.E., comm. D.McC. Piccadilly, 1960; A.Br.; (*Anon.*, 1960); 1961, D.McC.

BETULACEAE

- §BETULA PENDULA X PUBESCENS = B. X AURATA Borkh. D. E. Allen considers that it is this hybrid rather than *B. pendula* which is planted in the central parks.

FAGACEAE

- §†QUERCUS CERRIS L. *Turkey Oak*. Europe. Occasionally planted. Seedlings were noted in Rochester Row, S.W.1, 1961, D.McC.

SALICACEAE

- †POPULUS X CANADENSIS Moench. Delete record from Kensington Gardens (Kent, 1960). The solitary "sapling" proved to be a "sucker" from a mature tree some distance away.
- SALIX CAPREA L. Hyde Park, 1961, D.E.A.

PRIMULACEAE

ANAGALLIS ARVENSIS L. St. James's Park, 1961, D.E.A. Oval Cricket Ground, 1961.

BUDDLEJACEAE

†BUDDLEJA DAVIDII Franch. Hyde Park, 1961, D.E.A.

BORAGINACEAE

§*†HELIOTROPIUM PERUVIANA L. S. America. Garden escape. Hyde Park, 1961, D.E.A., det. D.McC.

CONVOLVULACEAE

CALYSTEGIA SEPIUM (L.) R.Br. Hyde Park, 1961, D.E.A.
(†C. SILVATICA (Kit.) Griseb. Strangely absent from the central parks where it is replaced by *C. sepium*.)

SOLANACEAE

*†LYCOPERSICON ESCULENTUM Hill. Eaton Square, S.W.1, 1960; Royal Oak, 1961, D.McC.

*†SOLANUM TUBEROSUM L. Hyde Park, 1960, D.E.A.

*†DATURA STRAMONIUM L.

§*†Forma TATULA (L.) A. Blytt. Hyde Park, 1961; the form with smooth capsules, D.E.A.

§*†NICOTIANA TABACUM L. *Tobacco*. S. America. Garden escape. Hyde Park, 1961, D.E.A., det. D.McC.

SCROPHULARIACEAE

§*†ANTIRRHINUM MAJUS L. *Snapdragon*. S. Europe. Garden escape. Hyde park, 1959, D.E.A. and D.McC.; 1961, A.Br.

§†CYMBALARIA MURALIS Gaertn., Mey. & Scherb. *Ivy-leaved Toadflax*. S. Europe. Very rare. Forecourt wall, corner of Bedford Row and Theobalds Road, W.C.1, 1960, P.R.K.

§*†LINARIA PURPUREA Mill. *Purple Toadflax*. S. Europe. Garden escape. Kensington Gardens, one plant, 1961, D.E.A.

§*SCROPHULARIA AQUATICA L. *Water Betony*. Hyde Park, a solitary large plant in an ornamental stone bowl (since demolished), near the Dorchester Hotel, 1960, D.E.A.

VERONICA HEDERIFOLIA L. Regents Park, 1961, H.C.H.

†V. PERSICA Poir. Oval Cricket Ground, plentiful on a heap of introduced soil, 1961.

§*V. POLITA Fr. *Grey Speedwell*. Hyde Park, one plant, 1961, D.E.A.

§V. ARVENSIS L. *Wall Speedwell*. Weed in open frame, Hyde Park, 1961, D.E.A.

§†DIGITALIS PURPUREA L. *Foxglove*. Possibly a garden escape. Hyde Park, 1961, A.Br.; D.E.A. and D.McC.

VERBENACEAE

§*†VERBENA BONARIENSIS L. S. America. Garden escape. Hyde Park, 1961, A.Br.; D.E.A. and D.McC. Kensington Gardens, 1961, D.E.A., det. D.McC.

§*†V. x HYBRIDA Voss. Garden escape of horticultural origin. Hyde Park, 1961, D.E.A., det. D.McC.

LABIATAE

LAMIUM AMPLEXICAULE L. Hyde Park, 1959-61, D.E.A.

DIPSACACEAE

DIPSACUS FULLONUM L. Kensington Gardens; probably planted.

COMPOSITAE

- §*†*RUDBECKIA BICOLOR* Nutt. N. America. Garden escape. Kensington Gardens, one plant on a soil dump, 1961, D.E.A. and D.McC.
- §*†*HELIANTHUS ANNUUS* L. *Sunflower*. N. America. Garden escape, or introduced with cage-bird seed. Kensington Gardens, one plant, 1961, D.E.A.
- §*†*GUIZOTIA ABYSSINICA* Cass. N. Africa. Piccadilly, introduced with cage-bird seed, 1960, A.Br. and D.McC.
- SENECIO JACOBAEA* L. Hyde Park, 1960-61, D.E.A.
- S. SQUALIDUS* X *VISCOSUS* = *S. X LONDINENSIS* Lousley. Rotten Row, Kensington Gardens, 1949.
- §*S. SQUALIDUS* X *VULGARIS* = *S. X BAXTERI* Druce. Hyde Park, one plant, 1960‡, D.E.A.
- §**PULICARIA DYSTENTERICA* (L.) Bernh. *Common Fleabane*. Oval Cricket Ground, in fair quantity on a heap of introduced soil, 1961.
- †*SOLIDAGO ALTISSIMA* L. Hyde Park, 1960, D.E.A.
- CHAMAEMELUM NOBILE* (L.) All. For "Kensington Gardens" (Kent, 1960) read "Kensington Palace". Introduced in all cases.
- †*CHRYSANTHEMUM PARTHENIUM* (L.) Bernh. Belgrave Square, S.W.1, 1955, D.McC.
- †*ARTEMISIA VERLATORUM* Lamotte. York Way, N.1, 1953. Paddington Green, 1961.
- §*ARCTIUM NEMOROSUM* Lejeune. *Burdock*. Very rare. Hyde Park, Bird Sanctuary, 1960‡, D.E.A.
- §**CARDUUS NUTANS* L. *Nodding Thistle*. Kensington Gardens, one plant on a soil dump, 1961, D.E.A.
- §*†*CENTAUREA DILUTA* Ait. N. Africa. Piccadilly, introduced with cage-bird seed, 1960, A.Br.
- §*C. SCABIOSA* L. *Hardhead*. Battersea, 1961, D.McC.
- §**PICRIS ECHIOIDES* L. *Bristly Ox-tongue*. Hyde Park, one very tall plant, 1961, A.Br.; D.E.A.
- §*HIERACIUM STRUMOSUM* (W. R. Linton) A. Ley. Hyde Park, Bird Sanctuary, D.E.A., det. B.M.
- †*H. VAGUM* Jord. Hyde Park, a single plant near Marble Arch, 1959, D.E.A.‡, det. P.D.S.
- †*CREPIS VESICARIA* subsp. *TARAXACIFOLIA* (Thuill.) Thell. Paddington, 1961. Hyde Park, one plant, 1961, A.Br.; D.E.A. and D.McC.
- §*TARAXACUM RUBICUNDUM* Dahlst. Kensington Gardens, D.E.A.

JUNCACEAE

- §*JUNCUS CONGLOMERATUS* L. Very rare. Kensington Gardens, one plant in turf, 1960, D.E.A.

TYPHACEAE

- §*TYPHA LATIFOLIA* L. *Great Reedmace*. Very rare. Mecklenburgh Square, W.C.1; known for some years in uncompleted foundations of a new building, 1960, s.c.

CYPERACEAE

- CAREX HIRTA* L. St. James's Park, D.E.A.
- C. SPICATA* Huds. Kensington Gardens‡, D.E.A.
- C. OVALIS* Gooden. Hyde Park, D.E.A.

GRAMINEAE

- GLYCERIA MAXIMA (Hartm.) Holmberg. Kensington Gardens, beside the Serpentine, 1961, D.E.A.; D.McC. and R.R., conf. A.M. Probably planted, though D. E. Allen has pointed out that the plant was recorded from beside the Serpentine as long ago as 1813.
- FESTUCA PRATENSIS Huds. Hyde Park; St. James's Park, D.E.A.
- F. ARUNDINACEA Schreb. Hyde Park, 1960, D.E.A.†; 1961, D.E.A.; D.McC.
- *†LOLIUM TEMULENTUM L. Hyde Park, 1961, A.Br. Piccadilly, 1960-61, D.McC.
- §*†TRITICUM AESTIVUM L. *Bread Wheat*. Hyde Park, two places, 1961, D.E.A., det. A.M.
- §*VULPIA BROMOIDES (L.) C. C. Gmel. *Barren Fescue*. Hyde Park, 1961, D.E.A. and D.McC.
- P. TRIVIALIS L. Hyde Park; St. James's Park, D.E.A.
- *†P. PALUSTRIS L. Waste heaps near Marble Arch, 1961, D.McC. and R.R., conf. J.E.L.; D.E.A., det. A.M.
- §*†MONERMA CYLINDRICA (Willd.) Coss. & Dur. Mediterranean region. Piccadilly, 1961, D.McC.
- HORDEUM SECALINUM L. Hyde Park, extensively sown after the summer of 1959, D.E.A.
- *†H. DISTICHON L. Hyde Park, 1961, D.E.A., det. A.M.
- §*†KOELERIA PHLEOIDES (Vill.) Pers. Mediterranean region. South Bank, S.E.1, outside the Festival Hall, 1961, D.E.A., det. J.E.L.
- §DESCHAMPSIA FLEXUOSA (L.) Trin. *Wavy hair-grass*. Very rare. Kensington Gardens, in old turf south-west of Lancaster Gate, 1961, D.E.A., det. A.M.
- AGROSTIS STOLONIFERA L.
- §Var. PALUSTRIS (Huds.) Farw. Kensington Gardens, D.E.A., conf. A.M.
- *APERA SPICA-VENTI (L.) Beauv. Hyde Park, in a flower-bed, 1961, D.E.A., det. D.McC.
- PHLEUM PRATENSE L. St. James's Park, D.E.A.
- *ALOPECURUS MYOSUROIDES Huds. Hyde Park, 1961, D.E.A. and D.McC.
- *†PHALARIS CANARIENSIS L. Piccadilly, 1960, A.Br.; (*Anon.*, 1960).
- *†SETARIA VIRIDIS (L.) Beauv. Piccadilly, 1960, A.Br. and D.McC.; (*Anon.*, 1960).
- *†PANICUM MILIACEUM L. Piccadilly, 1960, A.Br. and D.McC.; (*Anon.*, 1960). Kensington Gardens, 1961, D.E.A.

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Some Plants of Ham Common, Surrey 1941-1961

By B. WELCH

HAM COMMON, with an area of some 125 acres, is south of Richmond, on either side of the main road to Kingston, on sandy gravel (alluvium). It is more or less flat and little above river level, between the Thames and the rising ground of Richmond Park, from which, north of Ham Gate, it is separated only by the wall. On its north-west side the Common is bounded by the fence of Sudbrook Park golf course. Along the south-western edge are the Church, vicarage and other residences to Lachmere House at the southern corner, beyond which Church Road turns northward past Wilmer House to Parkgate House. The road from the Park Gate to the main road is a straight avenue of Sycamores.

In *A New London Flora*, 1877, p. 116, Eyre de Crespigny described Ham Common as "an open green with an avenue of Elms right of the high-road; wild and furze-grown left of it, and extending for nearly a mile to the borders of Richmond Park". The section west of the high-road is still an open green on which football and cricket are played. There is a pond furnished with water-lilies and periodically cleaned out; on the margin Glaucous Sweet-grass (*Glyceria declinata*) has been seen, and in the turf nearby were a few patches of Sand Spurrey (*Spergularia rubra*), Slender Yellow Trefoil (*Trifolium micranthum*) and Buckshorn Plantain (*Plantago coronopus*).

The part across the high-road still gives an impression of wildness but furze is no longer dominant. Much is now approaching woodland of birch and oak. The 1945 1" O.S. map shows the whole area east of the Kingston road as "rough pasture", while the 1954-55 revision shows the section north of the Park Road as woodland. In the section to the south little open grass now remains. Ham Common is administered by Richmond Borough Council, through its Parks Committee, and a bye-law forbids grazing, e.g. by a donkey; rabbits were, by a Council decision in February 1960, to be exterminated. Horse-riding has been allowed since 1949.

During the hot dry summer of 1921 Ham Common was devastated by fire and some species were probably lost at that time. Among plants mentioned in the 1931 *Flora of Surrey* for Ham Common and which I have never seen there, are Lesser Gorse (*Ulex minor*), Spiny Rest-Harrow (*Ononis spinosa*), Burrowing Clover (*Trifolium subterraneum*), Trailing Tormentil (*Potentilla anglica*), Sheepsbit (*Jasione montana*) and Creeping Willow (*Salix repens*). However, the vegetation recovered and by 1941 included wide stretches of Bracken, damp grassy patches and pools, and thickets near the Park wall. Gorse and Bracken fires occur annually; a large area in the northern part was burnt in April 1956 and again in 1959. To facilitate fire-fighting Richmond Council trimmed back the bushes in 1949-50 to widen the paths parallel with the Park wall, and one connecting them, and have since tipped great quantities of cinders and household and garden refuse to fill in wet hollows near the northern corner. This has introduced an assemblage of plants which one hopes will not survive. Garden rubbish has also, over the years, been tipped in hollows along the south-west side of the Common and here Horseradish, Hoary Cress

(*Cardaria draba*), thistles, nettles and Couch-grass have become established.

SOUTH OF THE PARK ROAD the western end is still an area of rough open grass with some planted trees including two cedars. The grass is chiefly Common Bent (*Agrostis tenuis*), Fine-leaved Sheep's Fescue (*Festuca tenuifolia*) and Smaller Cat's-tail (*Phleum bertolonii*) with frequent Field Woodrush (*Luzula campestris*) and big mats of Heath Bedstraw (*Galium saxatile*), some Ladies' Bedstraw (*G. verum*), Bulbous Buttercup (*Ranunculus bulbosus*), Lesser Stitchwort (*Stellaria graminea*) and Sheep's Sorrel (*Rumex acetosella*) with occasional Harebells (*Campanula rotundifolia*), Tormentil (*Potentilla erecta*) and Heath Groundsel (*Senecio sylvaticus*). Wavy Hair-grass (*Deschampsia flexuosa*) is locally abundant and some Creeping Soft-grass (*Holcus mollis*) occurs. In trodden sandy places Buckshorn Plantain and Sand Spurrey are sometimes seen. Here and elsewhere on grassy edges of paths Oval Sedge (*Carex ovalis*) and Pill Sedge (*C. pilulifera*) occur. North of the Church one patch of Common Chamomile (*Chamaemelum nobile*) survived until 1944. This was one of the plants listed by de Crespigny in 1877 (as *Anthemis nobilis*).

Between the Church and Wilmer House is an old causeway track having a wide shallow hollow to the north; this is water-filled in winter, but in recent years it has been almost dry in summer and is now overgrown with rushes (*Juncus effusus*) and its perimeter used by boys as a cycle-track. On the sandy edges are to be found the little Birdsfoot (*Ornithopus perpusillus*), Parsley Piert (*Aphanes microcarpa*), Heath Grass (*Sieglingia decumbens*), Squirrel-tail Fescue (*Vulpia bromoides*) and Early Hair-grass (*Aira praecox*). Nearby grows the only patch of Broom I have ever known on Ham Common. Between the causeway and the Park Road are many pits and hollows with willows (*Salix atrocinerea*), and sometimes with Floating Sweetgrass (*Glyceria fluitans*), Great Hairy Willow-herb (*Epilobium hirsutum*), Amphibious Bistort (*Polygonum amphibium*), Common Sedge (*Carex nigra*), Hairy Sedge (*C. hirta*) and Fox Sedge (*C. otrubae*). Up to 1943 two patches of Needle Whin (*Genista anglica*) were known in these hollows. On the old undisturbed surface are Gorse and Bracken among which birch and oaks are growing into trees.

One of the greatest treasures of Ham Common is the Least Water-pepper (*Polygonum minus*) which is now a scarce species in Surrey. It is a dainty plant with neat leaves and pale pink flowers. I have never failed to find it in September, somewhere on Ham Common, but it comes and goes as regards individual localities, though for many years the margins of the wide shallow hollow and ditches and pits near the causeway were a good place for it; at present this area is too overgrown. In 1955 there were a few plants of the hybrid with *P. persicaria* in a ditch by the hollow. This hybrid (*P. × braunianum* F. W. Schultz) was collected in 1944 by J. E. Lousley in the north corner of the Common, the other main area for *P. minus* (*Hand List of the Plants of the London Area*, p. 240).

Another unusual plant for a Common in the London Area is the June Berry (*Amelanchier confusa*) of which there are nearly a dozen in this section near Church Road. They are difficult to find except during the few April days before the widely-spaced white petals fall. One, across the road from near the entrance gate to Lachmere House, was quite a tree in 1943 and still survives. Others are more shrubby and some on

the edges of pits appear to have grown from garden rubbish, but the one north of the Park Road may have been bird-sown.

Formerly Ham Common was notable for varieties of Dog Rose and some still occur, but the number is diminishing as shading from trees increases, and others were lost when Lachmere Lane became a built-up area. The Silver Birch (*Betula pendula*) predominates on the Common, but the Downy Birch (*B. pubescens*) and intermediates also occur. Oaks are usually mixed with the birches, but near Wilmer House the thicket is largely hawthorn growing through Bracken. Near the south corner of the Common the woodland seems old-established with Bluebells, Pignut (*Conopodium majus*), Ivy and Honeysuckle. Elders occur, but are not frequent, and a few scattered crab-apple trees, and some young pear trees, the latter perhaps planted.

NORTH OF THE PARK ROAD a major path runs parallel with the Park wall and golf course fence, a few yards from them. In the 1940's the northern part was a marshy area with dense thickets of Aspen trees. These were severely burnt in 1956 but suckers have grown up. Like the rest of the Common, this area is much drier now, and there has been dumping in the hollows, especially in one beside the path near the wall, where there used to be Lesser Spearwort (*Ranunculus flammula*), Greater Birdsfoot Trefoil (*Lotus pedunculatus* (*L. uliginosus*)) and Water-pepper (*Polygonum hydropiper*) among the rushes. Three Crack willows and a Wych Elm survive. Close to the north corner is the remains of a pool, formerly deep but now nearly filled with rubbish. Since 1943 it has been noteworthy for a fine show of Greater Yellow Cress (*Rorippa amphibia*) which is more usually seen by rivers. Around 1943, between the fence and the path there was a damp ditch with Trifid Bur-marigold (*Bidens tripartita*), but this is now lost. A little to the south-west was another pool in which grew Tubular Water-dropwort (*Oenanthe fistulosa*), Marsh Speedwell (*Veronica scutellata*), neither seen since 1945, Blinks (*Montia fontana*) which has not been seen since 1946, Orange Foxtail Grass (*Alopecurus aequalis*) which survived to 1954, Lesser Spearwort, Lady's Smock, Marsh Bedstraw (*Galium palustre*) and plenty of Least Water-pepper with other *Polygonums*. By 1954 this hollow was overgrown with rushes, mainly *Juncus effusus*, the Marsh Thistle (*Cirsium palustre*) increased and recently the tallows have colonized its bed and Japanese Knotweed (*Polygonum cuspidatum*) has gained a foothold.

From a point south-west of this, a grassy path runs parallel with the Park wall. Not far from the golf course fence two patches of Lousewort (*Pedicularis sylvatica*) and two plants of whitish-flowered Heath Milkwort (*Polygala serpyllifolia*) were seen in 1946, but not since. Further south along this path, but before reaching the widened path connecting it with the path by the wall, one passes a thicket of hawthorn, birch, oaks and gorse with dog roses, brambles, and honeysuckle, wood-sage, bluebells and greater stitchwort among the bracken. This had been burnt in 1956.

Further south along this path grow Harebells, Mouse-ear Hawkweed (*Hieracium pilosella*), Betony (*Betonica officinalis*) Devilsbit Scabious (*Succisa pratensis*) and Saw-wort (*Serratula tinctoria*), the last much diminished in quantity since 1943. Wavy Hair-grass (*Deschampsia flexuosa*), Heath Grass (*Sieglingia decumbens*) and Velvet Bent (*Agrostis canina*) occur. Heath Dog Violet (*Viola canina*) and Heather (*Calluna vulgaris*) which were scarce by 1943, are no longer to be found, nor is the Burnet Rose (*Rosa pimpinellifolia*) of which a small patch, east of the

path, was thriving and had many flower buds in 1945. It was burnt in 1946 but flowered in 1949 and 1950, but by 1955 coarser vegetation seems to have overwhelmed the Burnet Rose. Hairy Tare (*Vicia hirsuta*) was nearby until 1945. Rabbits were seen along this path occasionally between 1955 and May 1961.

To the west of this path, there was in the 1940's an expanse of bracken with Pill Sedge frequent on the little paths, but since then the birches have grown up. Nearer the golf course there was another thicket of aspens. They were burned off in 1959 but not killed. The ground here is much pitted and still generally damp. Around the aspens is the stronghold of Needle Whin (*Genista anglica*) which shoots up again after being burnt, but there was much more of it here about 1943. Nearby are Betony and Slender St. John's Wort (*Hypericum pulchrum*) with Common Birdsfoot Trefoil (*Lotus corniculatus*) and fine patches of Tormentil on the path. Compact Rush (*Juncus conglomeratus*) is here and under the willows some Least Water-pepper (*Polygonum minus*) was seen in 1961, but not Trailing St. John's Wort (*Hypericum humifusum*) which was found nearby in 1946 but not seen since. Common Sedge (*Carex nigra*) is abundant in one pit. Heath Grass (*Sieglingia decumbens*) is quite frequent in this part, but (in marked contrast to Richmond Park) Mat-grass (*Nardus stricta*), of which a tuft was seen here in 1961, is very rare on Ham Common.

Westward of this damp area is now dense birch wood, but up to 1950 (when it died) there was a Rowan tree (*Sorbus aucuparia*) by a bank with Lesser Dandelion (*Taraxacum laevigatum*), Wall Speedwell (*Veronica arvensis*) and Mouse-ear Chickweed (*Cerastium glomeratum*), all now probably lost through shading. Further south-west is some old blackthorn thicket and some gorse, though diminished by fires. Rosebay has come into a few areas after bracken fires, but is not abundant on this Common.

Between the Park wall and the parallel "Burnet Rose Path" the vegetation is markedly different, suggesting that the soil is heavier and not acid here. This is no doubt due to downwash from the London Clay slope in Richmond Park, before the wall was built. This is one of the most interesting parts of the Common, for among the thickets of hawthorn and blackthorn are tall shrubs of Common Buckthorn (*Rhamnus catharticus*) with Guelder-rose (*Viburnum opulus*) and Dogwood (*Thelycrania sanguinea*) while between the wall and the path alongside, is Privet with abundance of Honeysuckle, Black and White Bryonies with Field and Dog Roses. Though there are patches of Hawthorn so dense that there is no undergrowth in the deep shade, there are some little paths (presumably kept open by Cowboys and Indians) bordered by Wood-sage (*Teucrium scorodonia*), Betony and Zigzag Clover (*Trifolium medium*). This thicket seems to have escaped burning for many years. Near the path by the wall is a fine patch of Adder's Tongue fern (*Ophioglossum vulgatum*) and an occasional Male fern and Broad Buckler fern (*Dryopteris dilatata*), Creeping Jenny (*Lysimachia nummularia*) and Pepper Saxifrage (*Silene silaus*), the last usually a plant of damp clay meadows. On a walk along here in April one gets an impression of old woodland with the Bluebells (*Endymion non-scriptus*), Greater Stitchwort (*Stellaria holostea*), Cuckoo Pints (*Arum maculatum*) which are abundant near the wall, Pignut (*Conopodium majus*), Ground Ivy (*Glechoma hederacea*), Dog Violets (*Viola riviniana*), Three-nerved Sandwort (*Moehringia trinervia*) and Barren Strawberry (*Potentilla sterilis*). Later in the season one finds Tufted

Vetch (*Vicia cracca*), Agrimony (*Agrimonia eupatoria*), Hedge Woundwort (*Stachys sylvatica*), Hedge Parsley (*Torilis japonica*), Remote Sedge (*Carex remota*) and the grasses, Slender False-brome (*Brachypodium sylvaticum*) and Giant Fescue (*Festuca gigantea*). Along this path, towards the southern end of the thicket, grew the Hairy Violet (*Viola hirta*) but this has not been seen since the path was widened for the rubbish lorries. Usually a plant of chalk downs, it was recorded as being here on London Clay by G. Nicholson (before 1908). It also grows on the Park side of the wall, as does the Adder's Tongue fern.

The boundary of Ham Common for a short distance north-west of the Park Gate is the Lachmere Brook before it runs under the wall. Stone Parsley (*Sison amomum*) and a patch of Horsetail (*Equisetum arvense*) occur near the stream, while on the wall above it is a fine growth of Feverfew (*Chrysanthemum parthenium*). Nearer Parkgate House is another old herb-garden plant, the Greater Celandine (*Chelidonium majus*). Other old garden plants are well established; Snowberry (*Symphoricarpos rivularis*) near Parkgate House and Ormeley Lodge, Sweet Violet near Sudbrook Cottage and by a stretch of wall in the golf course fence, the latter also the locality of Star of Bethlehem (*Ornithogalum umbellatum*).

At least two fly-bombs fell on Ham Common; one by the path near the golf course made a deep crater, soon filled in with refuse. This is still marked by garden Golden Rod, thistles and Largest Bindweed (*Calystegia silvatica*), which tipping has also introduced under the Park wall near the north end, where it is thriving. In 1958 there was one plant of *Juncus tenuis* on this tipped rubbish, and in 1955 a patch of *Juncus compressus*, a yard across, by a major track south of Park Road, but neither seems to have persisted. Under the wall of Sudbrook Lodge garden is a small patch of Dwarf Mallow (*Malva neglecta*), of which Dr. Turrill said in 1959 that he had known it there for fifty years. The most recently established alien is the California Brome (*Bromus carinatus*) first seen on Ham Common in 1959. There is now a 100 yard stretch on the verge of Park Road opposite the shelter.

Excavations at Carshalton, Surrey

By D. J. TURNER

INTRODUCTION

Between Sutton and Carshalton there are two dry valleys separated by a steep-sided spur of the North Downs. The dip of the chalk falls gradually to the north from Banstead Downs until the main Carshalton-Sutton road is reached. North of this road the ground falls rapidly and the spur ends as the chalk disappears under the tertiaries. (For a description of the similar ridge to the west see Moorman, 1961.)

The north end of the spur has produced a variety of archaeological remains.

- (a) When the railway line from Carshalton to Sutton was made in 1866 two Bronze Age hoards were found about two hundred yards apart (Grid Refs.: TQ/271641 and TQ/273644) (Birch, 1925, p. 103).
- (b) In 1920 a small Romano-British pot was found at the north end of Upland Road (Grid Ref.: TQ/26916377) (Birch, 1925, p. 104). Near this find a sewer trench revealed what appeared to be a series of parallel ditches.
- (c) Roman coins have been found in the area at various times (Birch, 1925, p. 104 and Turner forthcoming).
- (d) Anglo-Saxon graves were found when Carshalton Road was widened in 1903 (Clinch, 1904).
- (e) The north end of this ridge is supposed to have been occupied by a large earthwork (Birch, 1925). The evidence for this relies largely on notes made by a local resident in about 1905. The earthwork as described resembles a large Iron Age hill fort and has been accepted as such by a number of authorities (Whimster, 1931, p. 224; Ward Perkins, 1944, p. 169; Morris, 1959, p. 135). The description has, however, aroused doubts in several quarters because of certain of its features. (Plan p. 29.)

In view of the archaeological possibilities of the area and, more especially, the need for certain evidence regarding the earthwork, this Society carried out a series of excavations there at Easter, 1961. Members of the Beddington, Wallington and Carshalton Archaeological Society and of the Surrey Archaeological Society, notably Miss J. Harding and Messrs. E. A. Baxter, J. McN. Dodgeson and K. A. Prior, gave this Society much valuable help. As a result of the kind co-operation of various land-owners and householders (New Ideal Homesteads Ltd., Fairview Tennis Club, Dr. and Mrs. Cotton and Mr. Gullen-Whur) excavations were made at three separate points in the area. The thanks of all taking part are due to these organizations and individuals.

THE HARROW ROAD SITE

Between Hawthorne and Fairview Roads the supposed inner rampart of the earthwork forms the rear boundary of property on the west side of the Harrow Road. This boundary was sectioned between the Fairview Tennis Club and the site of the Harrowdene Tennis Club (Grid Ref.: TQ/27126396). Mrs. Birch (1925) described at this point "a well marked bank and ditch of considerable dimensions." There is to-day a well defined terrace along this boundary.

It was not possible, because of obstructions, to make one continuous cutting across this terrace, but the equivalent of an eighty-foot section

was cut in three parts. The trenches extended downhill to a point fifty feet from the crest of the terrace beyond which no further trenching was permitted by the owners of the site. No trace of a ditch was found. The bank was earthen and appeared to be a positive lynchet: there was no trace of a negative lynchet at this point. The lynchet was covered by a layer containing twentieth-century debris and apparently associated with the construction of the tennis courts. No datable objects came from the plough soil of the lynchet which had a maximum thickness of two feet.

This presents two possibilities:

- (a) that the plan accompanying the description of the earthwork (Birch, 1925) was wrong and the "bank and ditch" did not lie on this property boundary, or
- (b) that there never has been a ditch.

An intensive search over the whole area of the earthwork revealed little else that resembles the ramparts of a hill fort. However both the eastern and northern slopes of the spur exhibit extensive traces of terracing and several terraces are close to or on the line of the alleged ramparts. Such terracing would be characteristic of a field system developed on these hillsides. It is possible that these terraces were mistaken for a hill fort: it would not be the first time that the remains of a superseded field system had been mistaken for something more spectacular. However it must not be forgotten that in 1905 the area was largely fields whereas to-day it is entirely suburban and that the Harrow Road excavations tested the description at one point only.

18 HILLCROOME ROAD

A small trench cut to the rear of 18 Hillcroome Road revealed a narrow V-shaped ditch running NNW-SSE and passing about ten feet to the east of the parish boundary stone (Grid. Ref.: TQ/26646388). The plan (Birch, 1925) is ambiguous at this point but the ditch is near the line of the alleged earthwork. However the ditch was small and had not been open for any great length of time before being filled in. This ditch is unlikely to have been part of a large hill fort but it is hoped to investigate it further at a future date.

165 CARSHALTON ROAD

According to the current O.S. plans the Anglo-Saxon burials discovered in Carshalton Road in 1903 were found opposite the land between 165 and 171 Carshalton Road (Grid Ref.: TQ/27036424). The Society was permitted to excavate on this land adjacent to the road in the hopes of finding further graves. None was found in spite of trenching the whole of the land available for excavation. It seems probable that, as no other similar discoveries have been recorded from the vicinity, the original find was of an isolated group of burials. Small groups of Anglo-Saxon graves are a common occurrence in this area and are rarely shown to be part of a larger cemetery (Morris, 1959).

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The Buried Rivers of London

By R. E. BUTLER, B.Sc.

WHEN the Romans reached the Thames some nineteen hundred years ago they must have found a river much broader and shallower than that we know to-day. It is doubtful if the Thames was so affected then by tides as it is now; it was probably not tidal beyond the present site of London Bridge. Much of the countryside was covered with thick and, at times, waterlogged oak forest, quite unsuitable for human settlement. Here and there the clay soils of the forest gave way to sands and gravels which were not so heavily forested. A large part of the gravel represents the terrace deposits of the river laid down many thousands of years earlier and we refer to them to-day under the names of Boyn Hill, Taplow and Flood Plain terrace gravels. These gravels are quite recent from the geological point of view and are much younger in age than the London Clay, which forms much of the ground of the London area. Here and there are sandy beds known to the geologist as the Claygate Beds and the Bagshot Beds. These rest directly upon the London Clay and immediately follow it in geological age but, even so, are still much older than the terrace gravels.

To establish London, the Romans selected two small gravel-capped hills north of the Thames and close to the then upper tidal limits of the river. Between these hills flowed a small stream which was known as the Wall Brook since it entered the settlement through the wall built by the Romans to protect London. Its course divided the Roman city into two halves. With the passing of the Roman era, a certain amount of decay set in and for many years London remained more or less confined within the former Roman boundaries, but during the reign of Henry III (1216-1272) much of the surrounding countryside was cleared of forest and the land turned over to agriculture. Across this countryside flowed various small streams, often marshy in their courses. Many of the smaller streams arose from springs at the junction of the porous terrace gravels with the impervious London Clay, but some began further afield on sandy areas formed by the Bagshot and Claygate Beds that yield higher ground away from the course of the Thames. John Stow in his classic survey of London, made in 1598, gives us an excellent picture of the city but, even so, most of London was still confined within the original boundaries. The great expansion began in the eighteenth century and gathered momentum in the following century. The tendency was to build over the agricultural land and avoid the marshy valleys of the small rivers. Pollution, however, sealed the fates of the small streams, some of which became virtually open sewers and a menace to health. One by one they were put underground and to-day many are diverted into the general drainage system of London. Nevertheless they have left their marks on London in various ways. The former courses of some are still used as boundaries for administrative purposes whilst their names are perpetuated in roads and open spaces.

THE WALL BROOK (the modern rendering of the name is "Walbrook")

The Wall Brook was only a small stream, not much more than two miles in length. Its main sources were on the Taplow Terrace gravels near the present sites of Shoreditch station and the Hoxton end of the

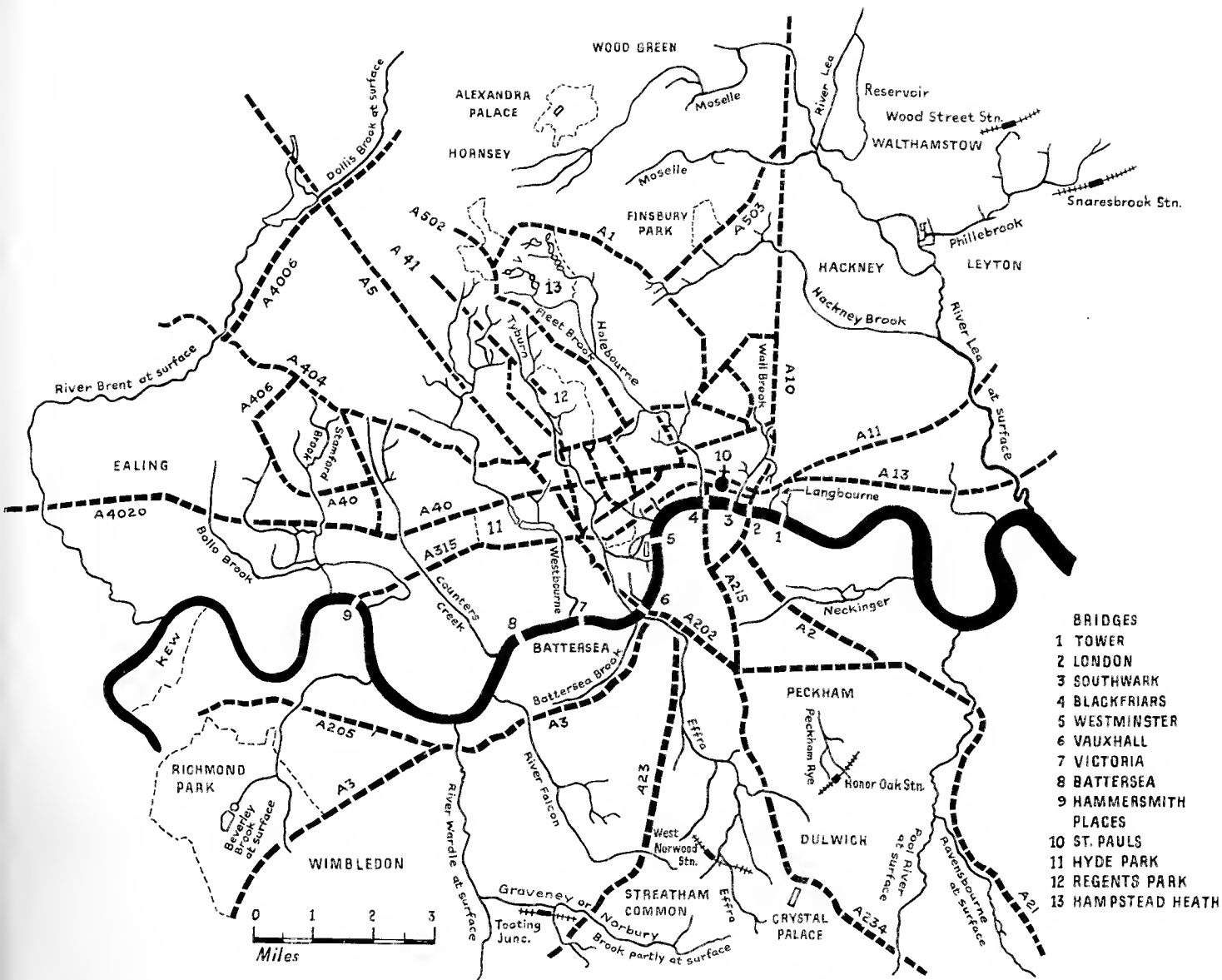
New North Road. In spite of its small size it cut for itself a definite valley through both the Taplow and Flood Plain Terrace gravels. The latter gravels provided, from springs, a number of small feeder brooks, notably from near Moorgate. An important tributary brook crossed Houndsditch and joined the main brook just north of the site of Liverpool Street station. The main course passed under Broad Street station and the Bank of England to reach the Thames at Dowgate between the present sites of Southwark Bridge and Cannon Street Railway Bridge. The flanks of the valley were built over at a very early stage in the development of Roman London and low walls were constructed to contain the stream. After the departure of the Romans, the valley and the culverts became blocked with rubbish and the stream, unable to flow properly, flooded the land to the north of the Roman wall and so created the area of marsh that became known as Moorfields. This marsh was an unhealthy place and persisted for a very long time through the Middle Ages. To combat pollution, the stream was cleansed from time to time, a duty which fell upon the shoulders of persons having land along its banks. The land-owners were also obliged to keep the bridges in good repair. One of the bridges recorded by John Stow was the Horseshoe Bridge, but no sign of it is to be seen to-day. More of this stream was walled during the reign of Edward III (1327-77) and, in the reign of Edward IV (1461-83), a start was made to cover over the course with brick. To-day there is little evidence of the Wall Brook but a careful observer might still notice the slight dip in Cannon Street that marks the valley. A narrow city street, however, bears the name of "Walbrook" and one can still see the exit of the conduit pipe that now carries the brook some twenty feet below the street.

THE LANGBOURNE

This, in spite of its name, was in fact very short. Its main distinction among London's small streams lies in the fact that it was the first to be covered over. This was probably done during the twelfth century. John Stow describes the Langbourne Water as a "great stream breaking out of the ground in Fenchurch Street". The actual source was close to Aldgate, on Flood Plain Terrace gravels and it probably took a course via the present site of Trinity House to reach the Thames just east of Custom House. This is the course shown on the Geological Survey six-inch maps. To-day there is no visible evidence of the Langbourne but the name was adopted for one of the wards of the city.

THE HOLEBOURNE

To some readers the name "River Fleet" might be more familiar but the Holebourne bore that name only for the lower part of its course. The term "Fleet Brook" is applied, however, to one of the sources on Hampstead Heath. It is difficult to assess from the records the true name for the stream. The name "Holebourne" may originally have been "Hollow Bourne", that is a stream flowing in a hollow. The modern name of Holborn is no doubt derived from this. In the times of Elizabeth I it seems that the name of Oldbourne was commonly used and this later became known as Turnmill Brook. The term "River of Wells" was also commonly used since over part of its course it received water overflowing from various wells. The origin of the term "Fleet" has given rise to some speculation. The name could have arisen from the fact that the stream must have been a fairly fast flowing one. From its sources on



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Tettigonia viridissima Linn.



Hampstead Heath to its exit into the Thames at Blackfriars, a distance of ten miles, there is a fall of nearly three hundred feet and even over the lower part of its course from Kings Cross to the Thames the fall is about forty feet. Alternatively, the term "Fleet" also meant a creek and the stream entered the Thames via quite a sizeable creek.

The stream starts as several springs on Hampstead Heath where the resulting brooks are, to this day, flowing on the surface. Some drain into Highgate Ponds which were formed by dams across the river valley. Through a grating in the bank of the most southerly of the Highgate Ponds the Holebourne commences its underground journey under London. Another branch, actually the Fleet Brook already mentioned, originates from several springs on the East Heath and drains into the Hampstead Ponds. This branch also goes underground when it leaves the ponds and passes under Hampstead Heath station before following an easterly course towards Gospel Oak. The junction between the two branches was effected near the site of Camden Town station. Over most of the course, apart from Hampstead Heath, which is mostly of the sandy Bagshot and Claygate Beds, the streams flowed on London Clay but after leaving the Camden Town district the Holebourne began to cut for itself a considerable valley into the Taplow Terrace gravel of the Bloomsbury district. From here onwards it began to receive water from wells that overflowed into it. Many of these wells belonged to the Clerkenwell group of springs and they included Clerkenwell itself, Skinner's Well, Fogg's Well, Rad Well and Loder's Well. The Horsepool in Smithfield also supplied water to the Holebourne. From Kings Cross to the Thames at Blackfriars the course was more or less southerly in direction and the creek, which it formed from Holborn onwards, was navigable. The creek was used mainly by coal barges which unloaded their cargoes at wharves established along its banks. There were several bridges. Fleet Bridge carried the road out of London via the Ludgate and was described as being of stone and coped up on either side with iron spikes. It also had lanthorns upon which lights could be placed during winter evenings. Further to the north was another stone bridge, Oldbourne Bridge or Holborn Bridge, that carried a road out of the city via the Newgate. These two bridges are marked on a map of London published in 1560. Other bridges were added later. These included Cowbridge, which was of wood, and Bridewell Bridge, which spanned the Holebourne close to its junction with the Thames. Sir Christopher Wren's designs for the rebuilding of London after the Great Fire of 1666 provided for six bridges between Clerkenwell and Blackfriars. Further north the Holebourne was bridged in what is now the Kings Cross district. This bridge, which was of brick, was known as Battle Bridge and gave its name to the district. According to tradition, Battle Bridge marked the site of the battle between the Romans under Suetonius Paulinus and the army of Boadicea, Queen of the Iceni. The name of Battle Bridge persisted until 1830, when the name of Kings Cross was substituted on the erection of a statue to George IV in the district. This statue proved to be very unpopular; although it was removed in 1845, there was apparently no suggestion of reinstating the original name of the district. The Holebourne suffered considerably from pollution, especially since there were many slaughter houses and pigsties established along its banks. Accumulations of mud proved also to be a great danger to life. As a result of a petition to Parliament in 1733, permission was given to cover up the stream. The

course between Fleet Bridge and Holborn Bridge was arched over during 1735 and further covering-up of the stream took place between 1760 and 1768. Later the Fleet Sewer was constructed and the exit of this can still be seen at Blackfriars Bridge. The water of the Holebourne now finds its way into the general drainage system of London and the sewer outlet at Blackfriars is used only during periods of exceptionally heavy rainfall. Names associated with the Holebourne are still preserved. Besides the Holborn district and the well known Fleet Street there is the lesser known Turnmill Street, whilst Newcastle Street and Seacoal Lane recall the coal barges that once sailed up the lower course of the stream.

THE TYBURN (Tybourne)

Like the Holebourne, the Tyburn rose in the Hampstead Heath area. Its name is probably derived from the Saxon words "Teo burne" meaning two rivers. It may be significant that this stream not only started as two small brooks but also had a double outlet to the Thames. Whilst the name of Tyburn was generally used there was also the alternative name of Aye Brook. The sources were near the present Fitzjohn Avenue and Belsize Park in Hampstead. The two headstreams adopted parallel courses southwards across the London Clay but the easterly branch was soon diverted westwards by Primrose Hill, causing it to join the western branch near the sites of Norfolk Road and Avenue Road in the St. John's Wood district. From there the brook flowed south-eastwards to skirt the western edge of Regent's Park, and near the present site of Bedford College it passed on to the Taplow Terrace gravels. About here it had a local name, "the St. Mary Burn", that has given rise to the modern name of St. Marylebone. After passing close to the present site of Baker Street station the course of the stream crossed Oxford Street near Bond Street station and reached Piccadilly just east of Hyde Park. Signs of its valley are still visible as the dip in Piccadilly, best viewed from Hyde Park Corner. The course passed through Green Park and under the present site of Buckingham Palace. The palace is built virtually on the point where the stream divided into its two main distributary channels. Both of these channels passed on into the area of the former marshes of Pimlico. This marshland persisted well into the nineteenth century, the final efforts of draining it not being started until about 1824. One branch of the Tyburn passed east of Victoria and was known locally as the Tach Brook, a name still preserved as Tachbrook Street. It reached the Thames just west of Vauxhall Bridge. The other main distributary channel turned eastwards following Buckingham Gate to reach Westminster where a further division took place and it reached the Thames via two channels. Between these two channels was a small "island" of Flood Plain Terrace gravels known as Thorney Island. In times of flood this was no doubt a true island and it was on this small patch of gravel that the church to become Westminster Abbey was built. Alongside the Abbey and also on this gravel the Palace of Westminster was built. The monks of Westminster exercised considerable control over the waters of the Tyburn which formed an important source of drinking water for London. Records show that, in the year 1238, nine large conduits carried Tyburn water to London. Many of these conduits were in the form of tree trunks, the centres having been burnt out with hot irons. The layer of charcoal thus formed inside these primitive pipes acted as a crude water purifier. Lead pipes were also used and water was stored in large lead cisterns. The first

large cistern of lead and stone was built in the year 1285 in West Cheap. Another large cistern was situated near Fleet Bridge. The monks at Westminster relinquished most of their control over the water in 1489 and signed an agreement with the city authorities permitting London to have as much water from the Tyburn as required, provided the Abbey did not go short of supply. With the expansion of London the Tyburn became polluted and so was put underground. To-day the water is diverted into sewers. The former main exit to the Thames can still be seen just to the east of Westminster Bridge, whilst to the west of Vauxhall Bridge the exit of the Tachbrook branch is still visible. Perhaps the last major effect this stream had on London was as late as 1900 when it provided problems for the engineers who were then constructing the Central London tube railway.

THE WESTBOURNE

This stream, also known as the Ranelagh Brook, had three main sources south of Hampstead Heath as springs located near Templewood Avenue, near Frogna Lane and just west of Redington Road; there is little evidence of them to-day. The course was southerly at first, being west of the present Heath Drive. On its way to the Thames the Westbourne received various tributaries. Of these, one began near the site of Paddington cemetery and another at the junction of Kilburn Lane with Sixth Avenue. After crossing the railway near West Hampstead station the course of the Westbourne eventually reached Kilburn Park Road. The name of Kilburn is no doubt derived from Keele Burn ("Cool Stream"), a local name for the stream. The Westbourne occupied the western side of Maida Vale and its course passed below the main Western Region line at Royal Oak station to reach the site of Westbourne Grove where it turned south-eastwards to Bayswater. Bayswater was a spa having chalybeate springs of some repute and the name may also have been used locally for the Westbourne. It was here at Bayswater that the brook began to channel out for itself quite a considerable valley through the Taplow Terrace gravels that form Hyde Park. A series of muddy ponds held up by the underlying London Clay appeared in its course. After leaving Hyde Park and these ponds it cut into the Flood Plain Terrace gravels along a course just to the east of the site of Sloane Street. After taking an easterly sweep across the present site of Chelsea Barracks it entered the Pimlico marshes and reached the Thames just west of Chelsea Suspension Bridge. Like the Tyburn, the Westbourne for a while supplied drinking water for the population of London. Conduits for this purpose were laid in the years 1437 and 1439 to carry water from Paddington to the City. The muddy ponds in Hyde Park were never attractive and at the instigation of Queen Caroline, consort of King George II, a scheme to improve them was begun in 1730. At a cost of £28,000 a dam was built across the Westbourne, and its valley in Hyde Park was turned into a lake. The dam is still there and so is the lake, the Serpentine as it is known to-day. For a hundred years the Westbourne fed and drained the Serpentine but pollution eventually took its toll. The stream became a dumping place for all types of rubbish and the floating of the bodies of dead animals in the stream was not an infrequent sight. In 1834 the Westbourne was put into an underground conduit and wells were bored at the Bayswater end of the Serpentine to obtain a fresh supply of water for the lake. The outflow channel through the dam was, however,

retained and can still be seen. As in many wells of London, overpumping became a problem, and between 1861 and 1912, the water level in the wells at Bayswater fell nearly a hundred feet. The wells were eventually sealed and now water from the Thames is used to feed the Serpentine. The Roman road out of London to the west crossed the Westbourne by means of a stone bridge known as Knight's Bridge. This was a very important point, for it was here that the city officials used to greet visiting dignitaries. It is recorded that in the year 1141, the citizens of London met Queen Matilda at this bridge. The actual bridge has long since gone but the name of Knightsbridge lives on. The conduit pipe that carries the Westbourne can still be seen crossing the District railway line at Sloane Square station.

COUNTERS CREEK

The origin of the name of this stream is unknown but it has been suggested that it was named after some local resident of the districts through which it flowed. It had two sources on the London Clay of the Kensal Green district. One of these was near Alma Place and the other at the north-eastern corner of All Souls cemetery. The two brooks joined near the site of Walmer Road and from then onwards the course followed what is now the West London Extension railway line. This follows Latimer Road, the Olympia, the site of the Earls Court Exhibition grounds and West Brompton station. After following the boundary of the Brompton cemetery the brook entered the Thames via Chelsea Creek. The Chelsea Creek is still to be seen but the whole of Counters Creek was covered over in 1854. Whilst not among the best known of the smaller rivers of London, Counters Creek has left a definite mark on the landscape of London. Its valley is still pronounced and was the obvious route for the railway line. Its course is still used as a boundary between the boroughs of Chelsea and Fulham. It was blamed by the local inhabitants as the cause for the rheumatism said to be prevalent in the area during Victorian times.

THE STAMFORD BROOK STREAM SYSTEM

To the west of Kensington there existed a rather complicated system of brooks. Most of these were forded rather than bridged. One such ford on the Roman road to Bath was called the Strong Ford for obvious reasons and this might point to the origin of the name of Stamford. Hammersmith and parts of Acton are situated on Brickearth which may represent an ancient alluvium whilst throughout the area are patches of Taplow gravel. North of these, a spread of London Clay stretches into the Willesden district. Three brooks arose on this London Clay. One was the Stamford Brook with its sources near the present site of Willesden Junction station, another was the Bollo Brook with its source near Hanger Hill and the third arose near the site of Acton cemetery. All the three streams flowed towards Chiswick. After crossing Wormwood Scrubs, the Stamford Brook had a southerly course which followed Old Oak Common Lane and Old Oak Road. Its course here marks the boundary between Acton and Shepherds Bush. The course then crossed Wendell Park and Stamford Brook Road to reach the site of the Underground station bearing the name of the stream. Here its course forms the boundary between Chiswick and Hammersmith. The Bollo Brook, sometimes called Bollo Creek, after passing under the Western Region

railway line, crossed the Uxbridge Road and then flowed on past what is now the Ealing Common railway depot and Acton Town station. It joined the Stamford Brook just north of Stamford Brook station. The third main headwater stream passed under Acton station and followed what is now Horn Lane, passing more or less through the centre of Acton before joining the Stamford Brook. In the past the countryside north of the present Underground railway line between Turnham Green and Ravenscourt Park must have presented a complicated pattern of small streams and was probably very waterlogged. The stream pattern was complicated further by the fact that the Stamford Brook divided close to Stamford Brook station. One branch headed eastwards towards Hammersmith and took a course via the now appropriately named Brook Green to the present site of St. Paul's School. From there it turned south into the Flood Plain Terrace gravels to Barons Court before doubling back westwards to reach the Thames near Chancellors Road. The other branch resulting from the division of the stream took a southerly course from Stamford Brook station to reach the Thames opposite Chiswick Eyot.

THE HACKNEY BROOK

This flowed from sources on the London Clay near the site of Holloway Prison. The course passed below the main railway line a short distance south of Finsbury Park station and then more or less followed Gillespie Road. It skirted the northern edge of Clissold Park and crossed Bouverie Road to form the northern boundary of the Abney Park cemetery. From there it cut into both the Brickearth and the Taplow Terrace gravel to form a valley floored with London Clay. Hackney Downs with their capping of Taplow gravel form much of the eastern side of this valley. From there the course became southerly in direction and passed by Hackney Downs station where a tributary stream originating from the Dalston Junction district came in. The brook turned eastwards once more and followed the line of Wick Road along the Flood Plain gravels to reach the alluvial flats of the River Lea. Instead, however, of effecting an immediate junction with that river it maintained a south-easterly course for some distance.

THE MOSELLE

This stream is very small indeed compared with the tributary of the Rhine bearing the same name. It drains the Hornsey district which is mostly of London Clay. It has two sources in Queen's Wood, one on the Hornsey playing fields and another close to Cranley Gardens and Woodlands Rise. The headwater brooks flowed eastwards to join up and adopt a north-easterly course to reach the Wood Green High Road near the site of Noel Park and Wood Green railway station. From there, following the appropriately named Moselle Avenue, the course continues north-eastwards to the Lordship recreation ground where the brook appears at the surface. Leaving the recreation ground in a pipe it continues north to Tottenham cemetery where it again reappears at the surface. From there it goes east and underground once more to pass under White Hart Lane station which is built on Taplow Terrace gravel. Then the course suddenly turns south to cross the Flood Plain Terrace gravels that form the western side of the Lea valley. After following Broad Lane, Tottenham, the Moselle eventually reaches the Lea. Another

branch of the Moselle rises in the Crouch End district close to Weston Park. It followed a more or less easterly course which took it under Green Lanes, Seven Sisters Road and South Tottenham station. It joined the Lea at the same point as the main Moselle stream.

THE PHILLEBROOK

This stream drained the Wanstead district. It began as two small brooks on the London Clay in Walthamstow and flowed across the Boyn Hill gravels of North Wanstead. The westerly branch had the most pronounced valley having cut right through the terrace gravels to reach the underlying London Clay. The two branches joined near Wadley Road and turned south west to cut a narrow valley through the Taplow gravels that cover the Wanstead Flats and the Leyton district. The floor of this valley whilst mostly being of London Clay does, however, have one small patch of the somewhat geologically older Woolwich beds at a point near Huxley Road. From Leyton the brook flowed into the alluvial flats of the River Lea and broke up into a number of tiny distributary channels.

THE NECKINGER

This stream had its source near the present junction of Grosvenor Terrace with the Camberwell Road and arose from springs in the Flood Plain Terrace gravels. It followed a course almost parallel with Albany Road, the Old Kent Road crossing it by means of a ford (no doubt the ford mentioned by Chaucer as the "watersplash of St. Thomas-a-Watering"). The Neckinger then entered the spread of Thames alluvium that now forms much of Bermondsey. It received various tributary streamlets and, after crossing what is now Bush Road, Deptford, it entered the Thames at St. Saviour's Dock. The name is perpetuated in Neckinger Street and the Neckinger estate. The stream was very much affected by the tides which reached well up stream making it navigable as far as the precincts of Bermondsey Abbey. The famous abbey, with its rich manor, was seized by Henry VIII. The grounds of the abbey passed into the possession of others and, in the process of time, many tanneries were established in the area. As late as 1820 these tanneries were using the tidal water of the Neckinger which was bridged at Grange Road. Later many of the tanneries went over to artesian well water and eventually the Neckinger was covered over.

THE EFFRA

The Effra was the most important of several streams that originated off the Crystal Palace Ridge. The origin of its name probably goes back to the term of "Heah Efre", which meant a high bank. The old English term of "Efre" also meant an area of high ground. The Crystal Palace Ridge consists of an elongated outcrop of the sandy Claygate Beds associated with a tongue of the much younger Plateau Gravel. It acts as a tiny river divide giving rise to a number of small streams. The brooks which flowed from the eastern side drained towards the Pool River and had lengths of up to a mile and a half. The Effra, on the other hand, was much longer and had a course of over four miles in length. The main source of the Effra was at the base of Highfield Hill, Upper Norwood and is now to be seen as a marshy patch in the centre of the Norwood recreation ground. Another source was close to the site of Gipsy Hill

station. In this area was located the celebrated Beulah spa which was situated on higher ground overlooking the Effra valley. In spite of the buildings and roads this valley is still a very marked feature of the district. The valley is also well seen in the grounds of the Convent of the Faithful Virgin at Norwood. The stream flowed north-westwards, passing Norwood Park, to cross the present site of Gipsy Road and the railway just to the east of West Norwood station where it received a small tributary from the south west. The course then swung slightly north-eastwards to cross the western corner of the South Metropolitan cemetery to reach Thurlow Park Road where the waters from the Gipsy Hill source came in. After following what is now Croxted Road the course turned again to the north east to reach Turret Road where the important tributary from Dulwich was received. The Dulwich arm of the Effra, which was put underground about 1850, began as springs on the Dulwich and Sydenham Hill golf course and flowed west through Dulwich Park, where the lake was probably once linked to this brook. After passing below Dulwich Art Gallery this branch joined up with the main Effra stream. From Turret Road the course of the Effra went on to Half Moon Lane to receive yet another small tributary. At a point just to the south of Herne Hill station the Effra received its Norwood branch. This branch followed Norwood Road for much of its course and skirted Brockwell Park. Leaving Herne Hill the Effra entered the area of Flood Plain Terrace gravels that form much of the Kennington and Lambeth districts. The course was now north-westwards along these gravels and followed Railton Road. At Coldharbour Lane the Effra received the Tulse Hill branch. This branch flowed parallel to, and to the west of, Tulse Hill Road to cross the southern end of Effra Road, Brixton. The lakes in Brockwell Park were once feeders for this. The main course of the Effra now followed the Brixton Road to reach Camberwell New Road just south of the Oval station. From here it turned north-westwards to skirt the Surrey County Cricket ground to reach the site of Vauxhall station. The course passed underneath this station and joined the Thames just to the west of Vauxhall Bridge. The Effra was navigable between Vauxhall and Kennington and was bridged in at least one place. There is a record of a Merton Bridge which once crossed it. The name of the stream is preserved in Effra Road but this road does not appear to be on its main channel. The Effra's course crossed the South London fault in places. This geological feature actually crosses Brockwell Park and passes just to the south of Herne Hill station. Much of the lower course of the Effra was no doubt very marshy. The Lambeth (Lamb Hithe) marsh persisted in places well into the nineteenth century and the early botanists record the Flowering Rush in the area at the end of the eighteenth century. Perhaps a more popular record of the Effra is that the first terracing at the Oval cricket ground was built on the material excavated when the stream was piped in 1850. The water of the Effra is now diverted into sewers.

THE FALCON BROOK

This stream may have once borne the name of Hydaburne or Hidaburne and probably obtained its present name from an inn past which it once flowed. It had several sources, that farthest from the Thames being just east of Valley Road, Streatham. From here it flowed across Streatham to reach the Boyn Hill Terrace gravel that forms Tooting Graveney Common. From there it turned north-westwards across what is now the

Balham High Road. Near the present site of Calbourne Road, Balham, it received various easterly branches which had sources near Tooting Bec Common and on the South London fault near Tierney Road. The brooks forming this easterly branch of the Falcon flowed through Balham to form a valley through the Boyn Hill Terrace gravels: Clapham Common forms the north bank whilst Tooting Graveney Common forms the south bank of this valley. The main brook, on the other hand, had a similar valley with Clapham Common on the east side and Wandsworth Common on the west side. The line of Northcote Road actually marks the course of the stream. At the northern end of the main valley the Falcon cut into the Taplow Terrace gravels to reach St. John's Hill near Clapham Junction. The rise of the ground level from the valley up to St. John's Hill is still a marked feature of the district. After passing Clapham Junction the stream followed what is now appropriately named Falcon Road and then turned westwards to enter the Thames at a point halfway between Wandsworth Bridge and the Chelsea Railway Bridge.

THE BATTERSEA BROOK

This brook was much shorter than its neighbour, the Falcon, and began as springs thrown out at the junction between the Flood Plain gravel and the London Clay at a point to the east of Clapham Junction and north of Lavender Hill. It took a north-easterly course and flowed in an alluvium-floored valley under Queen's Road, the Battersea railway depot and the Nine Elms depot to reach the Thames a short distance from the place where the Effra came in. The main Southern Region railway line bridges the valley between Vauxhall and Queen's Road stations.

THE GRAVENEY

This river has not yet been completely covered in. It passes to the north of Norbury station and follows a tongue of Taplow Terrace gravels. Some of its northern feeder brooks start on the London Clay in Upper Norwood and Streatham. The Wimbledon to Tooting branch railway line follows the course. Also known as the Norbury Brook, the Graveney joins the Wandle at a point where the railway line crosses that river.

THE PECKHAM RYE

The word "Rye" means a brook. The Peckham Rye has three sources, one at the southern end of Camberwell cemetery, another to the south-east of Honor Oak station and a third to the east of Peckham Rye Park. The latter two sources give streams which are still partly at the surface. The Honor Oak branch enters Peckham Rye Park from the south and feeds the ornamental water in the park. The stream entering the park from the east skirts the lake and enters a pipe close to the north-western end of the lake. The former course of the Peckham Rye can easily be traced along the western edge of Peckham Rye Common. The brook in former times eventually lost itself in the Thames alluvium and had no continuous channel to the Thames.

London had many other small rills and brooks besides those that have been described. Many were probably unnamed or had names that have now been lost. The Flood Plain gravels forming the north bank of the Thames provided several small brooks. Springs near the

present site of the National Gallery gave rise to a small stream that formerly crossed Trafalgar Square to reach the Thames along the present line of Northumberland Avenue. Its small creek where it joined the Thames was used by barges and was close to an important waterworks. Another small stream, a few yards in length, entered the Thames at the present site of Cleopatra's Needle. This brook was probably associated with St. Clement's Well in the Strand. A stream once flowed through the Poplar district to enter the Thames at Poplar Dock, whilst the Royal Mint is located very close to the former course of yet another small brook that flowed from the Flood Plain Terrace gravels. The lake in Barking Park was once part of the Loxford Water which was a tributary of the River Roding. The effects of water contained in the water-bearing strata of London are still major problems and such problems led to the abandonment of the plans to extend the Bakerloo tube from the Elephant and Castle to Camberwell. Whether any more of London's small streams will be put underground remains to be seen, but it is fairly certain that they will undergo whatever modifications human needs demand: plans are already proposed to straighten the course of the Ravensbourne in places. The courses of most of the known buried streams of London are recorded as accurately as possible on the six-inch to the mile maps published by the Geological Survey and any person requiring more detailed information on the courses is advised to consult these maps.

ACKNOWLEDGMENTS

I wish to express my gratitude to Mr. E. J. Furse for the preparation of the map, and to Mr. C. P. Castell for his helpful comments on the text.

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New Records of Musk Ox from Plumstead, Kent and Cosgrove, Northants.

With notes on its distribution in England

By J. W. SIMONS

THE Musk Ox, *Ovibos moschatus* Zimmerman, is one of the most interesting and unusual of contemporary mammals. As its generic name suggests, it has affinities to both the sheep and ox families (*Ovis* = sheep, *Bos* = ox), although it is now generally regarded as being more ox-like in character. The animal is notable for its musky odour. The shape of the horns is the most characteristic feature of the Musk Ox. The bases are placed extremely close together on top of the skull, rather like those of the African Cape Buffalo but the horns curve downwards, then upwards and outwards at their ends. In general the Musk Ox is heavily built, stands about five feet high at the shoulder and has short, stout limbs, large feet and long shaggy hair (figure I). At present it is to be found in remote arctic regions such as North Greenland and parts of North America and adjacent islands, associated with Reindeer, Wolverenes, Bears, Lemmings, Marmots and Hares. Unlike some other mammals the Musk Ox does not migrate to a warmer region at the oncoming of the long winter but, aided by its thick coat of hair, withstands the intensely cold months by foraging in the snow for its food and wandering from place to place in search of fresh pastures.

Fossil remains of this animal are rare, but have been discovered in North America, Siberia and in several European countries, the most recent find in Europe being from the Netherlands [23].*

During Pleistocene times the Musk Ox lived as far south as southern England. In England its remains have been discovered at only fifteen localities (fig. 1), five of which are in, or close to, the Thames Valley area not many miles from Central London.

I. NEW DISCOVERIES

Since the first discovery of the Musk Ox in the Pleistocene of England at Taplow in 1855 [2], and until 1934, a total of only nine imperfect skulls, two frontal bones, some teeth, a nasal bone, an atlas and axis, an astragalus and tibia, as well as an incomplete radius and femur, were recognized. These specimens were described and figured, in part by W. B. Dawkins in 1872 [7], and by S. H. Reynolds in 1934 [19], and previously by other authors.

Further fossil remains of this animal were recently brought to light and are the first to be reported since 1934. Three of these were found at Plumstead in Kent and another at Cosgrove in Northamptonshire.

(a) Plumstead, Kent

Remains of *Ovibos* were first discovered in the "Brickearth" at Plumstead, about nine miles from St. Paul's, by the Rev. B. Hale Wortham as long ago as 1902. These specimens, an incomplete right femur, the shaft of a radius and an axis vertebra (all now with the registration number

* Numbers in brackets refer to the references on page 52, which are arranged in chronological order and annotated to illustrate the history of the description and mention of English Musk Ox remains.

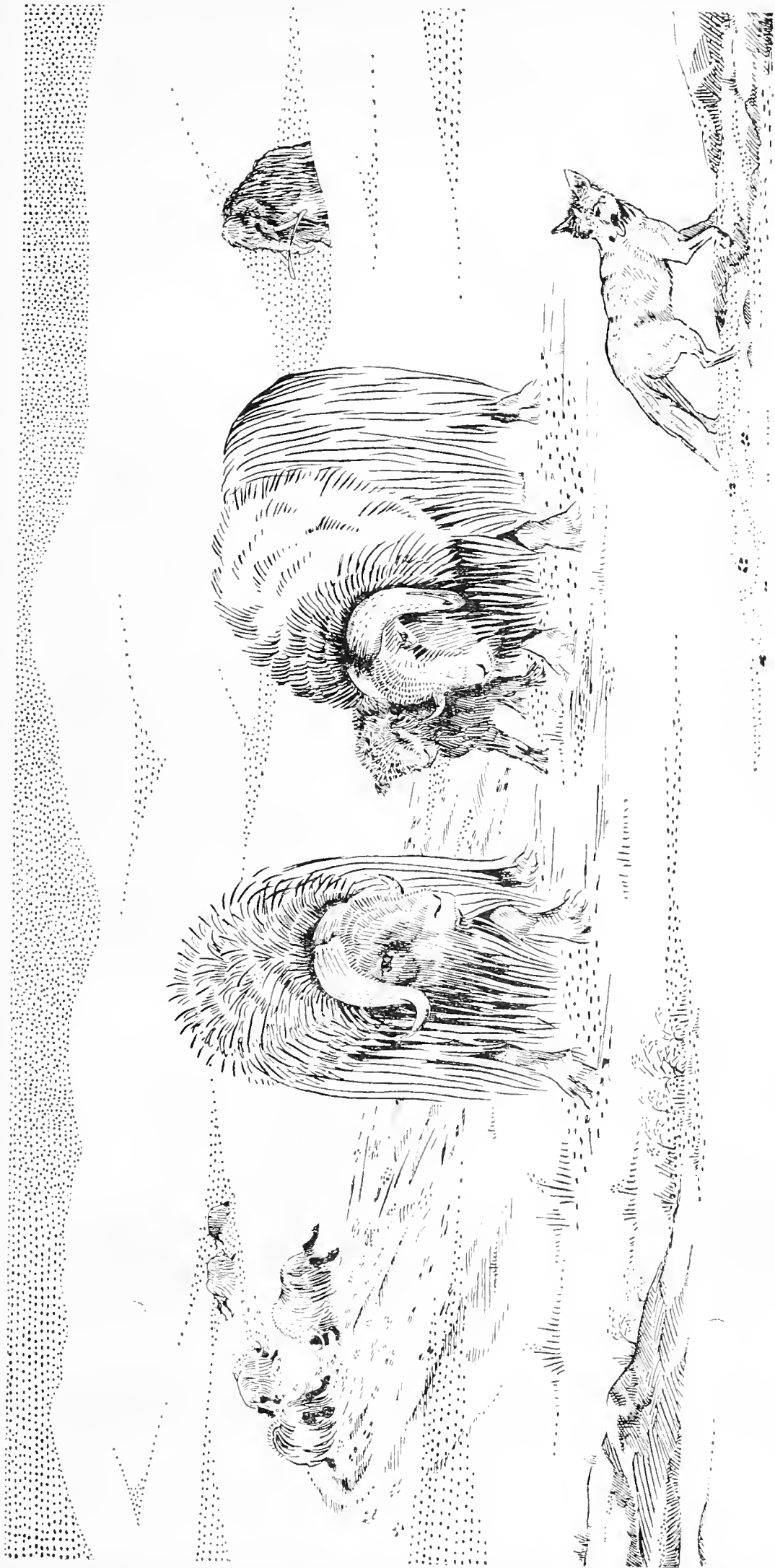
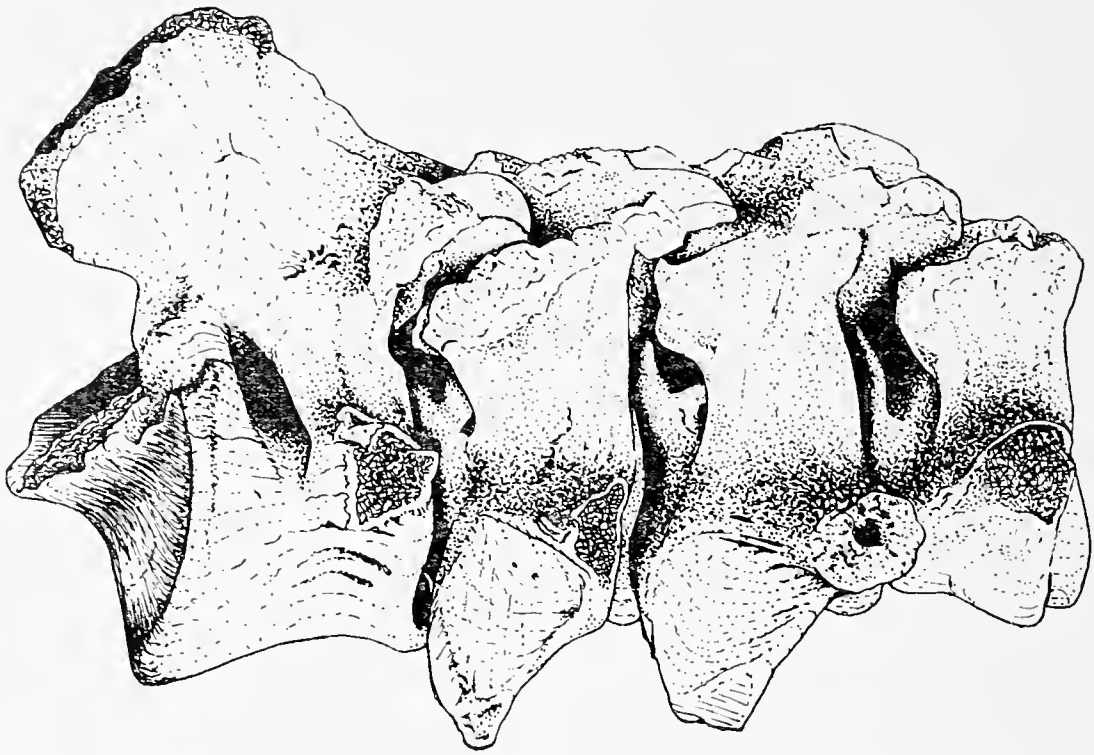
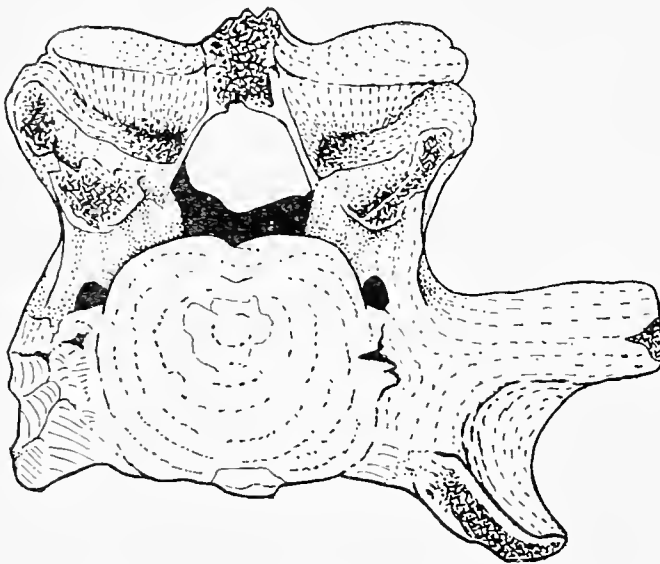


FIGURE I
RECONSTRUCTION OF FOSSIL MUSK OXEN AS THEY MAY HAVE APPEARED DURING PLEISTOCENE TIMES IN THE LONDON AREA.
(Associated with them are Fox and Mammoth).

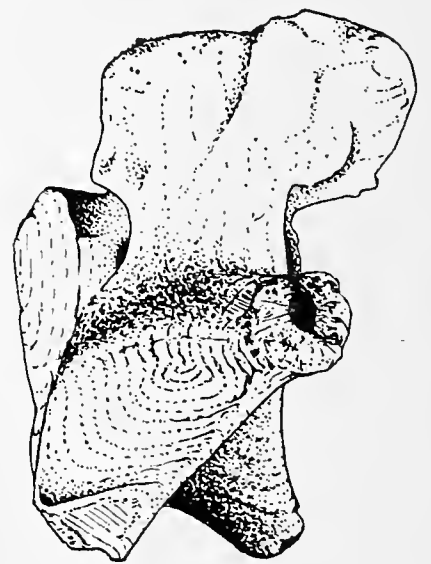
Drawing by Margaret Lambert.



d.



b.



c..

Drawn from photographs by J. W. Simons.

FIGURE II

MUSK OX REMAINS FROM PLUMSTEAD, KENT

- (a) Axis vertebra (B.M.(N.H.) No. M.8042) articulated with third, fourth and fifth cervical vertebrae (Plumstead Mus. Nos. 1939-121, 1939-119, 1939-165). Approximately one-third natural size.
- (b & c) Anterior and left lateral view of the fourth cervical vertebra (Plumstead Mus. No. 1939-119). Approximately three-eighths natural size.

B.M., M.8042), were presented to the British Museum (Nat. Hist.) during the same year and were described in 1905 [16] by C. W. Andrews who figured the axis vertebra. The radius and femur were not figured owing to their imperfect condition.

Three more specimens, found at King's Highway in the East Wickham Valley, had been stored for many years in the Woolwich Borough Museum and Library. They were sent to the British Museum (Nat. Hist.) for identification and were found to be the third, fourth and fifth cervical vertebrae of a Musk Ox.*

Other than an atlas from Ightham, Kent, and the axis previously mentioned, these are the only cervical vertebrae to have been discovered in England. On further examination these unique specimens were found to be of even greater interest as the writer was able to articulate them with the axis in the British Museum Collection, thereby forming part of the anterior end of a vertebral column of an individual animal (figure IIa). The preservation of these specimens is in all cases similar. Most of them have suffered damage to the neural spines, zygapophyses and transverse processes.

The most complete of the three new specimens is the fourth cervical vertebra (Plumstead Mus. No. 1939-119) (figure IIb, c). In the following table of measurements it is compared with the corresponding vertebrae of a present day Musk Ox, Ox and European Bison.

TABLE I.
MEASUREMENTS OF FOURTH CERVICAL VERTEBRAE OF MUSK OX, OX AND BISON
(Measurements in mm.)

	<i>Ovibos</i> (fossil) Plumstead Museum No. 1939-119	<i>Ovibos</i> (Recent Male) B.M.(N.H.), No. 1890. 9.7.1. (612 K)	<i>Bison bonasus</i> (Recent Euro- pean Bison) Sex unknown B.M.(N.H.), No. 1845, 10.13.2	<i>Bos taurus</i> (Recent Chart- ley Bull) B.M.(N.H.), No. 1924, 4.28.1
Width of anterior face of centrum	53	61	46	41
Height of anterior face of centrum	52	52	54	50
Length from the middle of the anterior to the middle of the posterior face of the centrum	41	45	62	74
Width of posterior face of centrum	66	69	62	66
Height of posterior face of centrum	63	57	60	64
Length of ventral surface of centrum	41	44	65	58

In the above table it can be seen that the fourth cervical vertebra of the fossil Musk Ox differs from those of the Ox and Bison mainly in that the centrum is much shorter and is also wider at the anterior end. It is

* The cervical vertebrae of the Musk Ox, described in detail by J. Richardson in 1852 [1], differ from those of Ox and Bison in that the articular faces of the centrum are rounder and are not strongly convex at the anterior and strongly concave at the posterior ends. The vertebrarterial canals are smaller, the neural canals are narrower, the neural spines do not slope anteriorly but are upright, there is no ventral spine, and the transverse processes are not flat but rounded. They are completely different from the cervical vertebrae of sheep.

comparable in size with that of the Recent Musk Ox and probably belongs to a male animal. (No cervical vertebrae of a fully mature female Musk Ox were available to the writer).

It is almost certain that all the Plumstead remains were obtained from the brick-pits which were formerly worked in the vicinity of King's Highway and Wickham Lane. The "Brickearth" was exposed in these pits during the 1880's and a section of the deposits was published by W. Whitaker in 1889 [13]. This figure shows that the deposit contains lenses of material dragged from the underlying Tertiary sands through which the East Wickham Valley is cut, a feature probably representing a hill-wash or sludge from the higher valley slopes rather than a river-laid deposit. The "Brickearth", reported as reaching thirty feet in thickness and underlain by gravel, mostly occupies the floor of the valley, but extends to a much greater height above sea-level on parts of the slopes. Since the deposit varies in its altitude and does not appear to be a fluvial aggradation, its relationship to the Thames river-terraces is uncertain, and its approximate age cannot, therefore, be reliably determined. The presence of *Ovibos*, however, and of other mammalian remains in the same deposit, such as those of Mammoth and Woolly Rhinoceros, suggests that the Plumstead "Brickearth" accumulated during a cold phase of the Pleistocene Period.

(b) *Cosgrove, near Wolverton, Northamptonshire*

In 1951, a very abraded and broken specimen from this site was presented by Mr. A. Clewett of the Cosgrove Sand and Gravel Co. to the British Museum (Nat. Hist.) where it now has the registration number B.M., M.16859. The occurrence of *Ovibos* at this locality has not, until now, been recorded.

The specimen is an imperfect cranium consisting of only the bases of the horn-cores and part of the occipital bone. The bases of the horn-cores, approximately 148 mm. in length from front to back, extend over the whole of the parietal region and are separated from one another by a gap, the coronal interspace, with a minimum width of 28 mm. As the bases of the horn-cores of the female Musk Ox are separated by a much larger interspace, the fossil cranium is probably that of a small male animal.

II. ASSOCIATED FAUNA, CLIMATIC ENVIRONMENT AND STRATIGRAPHICAL RANGE OF THE MUSK OX IN ENGLAND

The fossil Musk Ox remains found in England come from sites mostly distributed over the southern part of the country. The most northerly of these localities is in Yorkshire and the most southerly in Wiltshire. Remains of this animal have not yet been discovered in Scotland, Ireland or Wales. The distribution of the localities known at the present time are shown on the map (figure III) in relation to the probable limit of the ice of the Last Glaciation [22].

A clue to the climatic conditions in which the Musk Ox lived in England during the Pleistocene Period is provided by the associated mammalian remains. A list of localities follows and, where known, the names of the most important of the associated mammals have been included.



FIGURE III
DISTRIBUTION OF THE FOSSIL MUSK OX LOCALITIES IN ENGLAND

Many of the forms listed in the preceding table, particularly the Mammoth, Woolly Rhinoceros, Reindeer, Arctic Fox and Bison, were fairly common in this country during the cold phases of the Upper Pleistocene, and also during the cold phases of the Middle Pleistocene. Their remains are often found in deposits near London. These animals are considered by F. E. Zeuner [27, p. 310] to have probably lived in Tundra or Loess-Steppe conditions, suggesting therefore that the fossil Musk Ox, like its present day descendant, was adapted to a similar environment. Its apparent restriction to cold conditions is supported by the absence of warm indicators, or interglacial forms, such as the Hippopotamus, Straight-tusked Elephant, and the Narrow-nosed Rhinoceros. The occurrence of some interglacial elements at the Norfolk sites and at Crayford will be discussed in more detail on a later page.

It now remains to be determined whether *Ovibos* is restricted to one or several of the cold phases of the Pleistocene Period and whether it has ever been found in a warm deposit.

Although the age of many of the localities listed above has not been reliably determined, there is already sufficient evidence to show that all the Musk Ox remains found in England do not date from a single cold phase of the Pleistocene Period. Before discussing this evidence, however, a short note on the divisions of the Pleistocene may be useful.

Four cold, or glacial phases, are normally recognized in British Pleistocene stratigraphy; they are separated by warmer phases or interglacials. Deposits representing some of these stages are well developed in the London Basin as river terraces and each contains characteristic mammals, molluscs and sometimes plants [26], [28]. The sequence is as follows:—

TABLE III. PLEISTOCENE NOMENCLATURE (After Zeuner, 1959)		
<i>Glacial Phases</i>	<i>Interglacial Phases</i>	
LAST or WÜRM GLACIATION Ponders End Stage Lower Flood Plain Terrace		UPPER
	LAST INTERGLACIAL Upper Flood Plain Terrace (Eemian) Taplow Terrace	
PENULTIMATE or RISS GLACIATION Ebbsfleet Loess Main Coombe Rock		MIDDLE
	PENULTIMATE or HOXIAN INTERGLACIAL Boyn Hill Terrace	
ANTEPENULTIMATE or MINDEL GLACIATION High level gravels of Richmond, Kingston and Wimbledon		LOWER
	ANTEPENULTIMATE or CROMERIAN INTERGLACIAL Cromer Forest Bed of Norfolk	
EARLY or GUNZ GLACIATION Weybourne Crag Newer Red Crag		

The following two sites near London are the most important of those where a dating of the Musk Ox remains seems reasonably possible.

(i) *Ightham, Kent*

The famous fissures at Ightham, about twenty-three miles from London, were investigated by W. J. Lewis Abbot during the years preceding 1894. Although the remains found in the fissures were the subject

of several reports [14], [15], [17], the atlas of a Musk Ox apparently went unrecognized in his collection until 1934 [19]. In addition to the short faunal list already given on page 48, there were also discovered remains of a large number of voles and lemmings, small carnivores, bats, shrews, mole, birds, reptiles, amphibians and molluscs.

In 1926 [18] M. A. C. Hinton considered, when discussing the voles and lemmings, that the "Ightham Fissure Stage" was intermediate in age between that of the deposits of Crayford (see below) and the Ponder's End Stage of the Lea Valley (Last Glaciation). Since the Ightham mammalian assemblage (which includes Reindeer and Marmot, see table II), is essentially of a Glacial character, it would appear that an Upper Pleistocene date for the Musk Ox at this locality is assured.

(ii) Crayford, Kent

In order to determine the age of the Musk Ox remains found at Crayford, about thirteen miles from London, a brief discussion on the sequence of the deposits is necessary. The sequence, recorded by A. S. Kennard in 1944 [21], is as follows:—

- (a) "Upper Brickearth". The occurrence of Mammoth and Woolly Rhinoceros in this bed suggests that deposition took place during a cold phase.
- (b) "*Corbicula* Bed". Warm or temperate conditions are indicated by *Corbicula fluminalis*, a mollusc usually restricted to interglacial horizons in England. Most of the Crayford rodent remains (including the Marmot) appear to have been obtained from this level. These indicate somewhat cooler conditions than do the molluscs and it has been suggested [20], since some of them are burrowing forms, that they may have been intruders from the "Upper Brickearth". This opinion was not supported by Hinton.
- (c) "Lower Brickearth". This stratum contains a mixed mammalian assemblage of both cold and warm climatic indicators. A "floor" of Levalloisian implements occurs at the base of the deposit.
- (d) "Crayford Gravel". Late Acheulian implements are recorded from this bed.

As the Crayford *Ovibos* specimens, a skull and four teeth, were obtained from the Lower Brickearth, a consideration is required of the climatic significance of only the middle deposits (*b* and *c*) of the sequence.

Warm conditions are indicated in these beds by the presence of the southern forms, *Corbicula fluminalis*, Straight-tusked Elephant and Narrow-nosed Rhinoceros. Whilst there can be no doubt that the *Corbicula* Bed represents temperate or interglacial conditions, there is already sufficient evidence to show that part of the Lower Brickearth was not deposited during such a warm phase.

A cold phase is suggested in the bottom part of the Lower Brickearth by the occurrence at this level of remains of both the Musk Ox and Woolly Rhinoceros. Dawkins [7, p. 28] figures a section of the deposits showing the skull of the Musk Ox *in situ* in the lower part of this brickearth, and Kennard figures a jaw of Woolly Rhinoceros [21, pl. 7A] from the Levalloisian "floor" at the bottom. The abundance of another cold indicator, the Mammoth, in the deposit, helps to support this view. Thus there is a transition from cold to warm conditions in the middle part of the Crayford sequence.

The Crayford deposits are considered to form part of the 50 ft. or Taplow Terrace of the Thames and have been placed within the Last Interglacial. Since the Crayford interglacial horizon is at a greater height above sea-level, and is therefore older, than deposits which have been assigned to the Eemian (the climatic optimum of the Last Interglacial, e.g. the Upper Floodplain Terrace at Trafalgar Square [24], [29]), it would appear that this phase is earlier than the warmest part of the Last Interglacial. The absence from Crayford of *Hippopotamus*, found usually in the Upper Flood Plain Terrace, tends to support this opinion. The *Corbicula* Bed probably belongs, therefore, to the first part of the Last Interglacial. This would suggest, assuming the *Corbicula* Bed to be correctly placed, that the underlying cold deposits represent the closing phase, and last occurrence of the animals, of the preceding Penultimate Glaciation. F. E. Zeuner has in fact suggested [25, p. 195] that part of the Crayford sequence may belong to the Penultimate Glaciation. The Musk Ox remains at this locality may, therefore, be of either Late Middle, or Early Upper Pleistocene age.

It is interesting to note that at the type locality, a gravel pit about 400 yards north-east of Taplow Railway Station (formerly Maidenhead Railway Station), the Taplow Terrace deposits contain Musk Ox, Mammoth and Woolly Rhinoceros, indicating that a cold phase is also present here.

Evidence for the existence of the Musk Ox in earlier Pleistocene deposits in England is inconclusive. The record would not be complete, however, if the *Ovibos* remains from the following Norfolk localities were not mentioned.

(iii) *Trimingham, Eccles and Walcot, Norfolk*

The specimens from the above localities, two skulls and a frontlet, are believed to have been obtained from the Forest Bed series of deposits which are found almost exclusively along the Norfolk coast. Characteristic animals of these beds are the Etruscan Rhinoceros, *Dicerorhinus etruscus*, the Southern Elephant, *Elephas meridionalis* and Hippopotamus, *Hippopotamus* sp., all indicators of warm conditions (for a complete faunal list see Zeuner [27, pp. 316-7]). In addition to the assemblage, and also supporting its Lower Pleistocene character, are several surviving forms of Pliocene deer. The Forest Bed is usually placed within the Antepenultimate or Cromerian Interglacial. As *Ovibos* is normally regarded as a cold indicator and appears to be restricted to cold phases during Middle and Upper Pleistocene times, its occurrence in an interglacial deposit seems somewhat unusual. Zeuner [27, p. 317] considers, however, that its possible coexistence with another Northern form, the Wolverine or Glutton, may indicate cool conditions and that part of the Forest Bed sequence may, therefore, belong to the following Antepenultimate Glaciation. Since, however, there is apparently no evidence to show that the *Ovibos* remains were found *in situ*, a Forest Bed age for them is debatable.

III. SUMMARY OF CONCLUSIONS

It has been shown in the preceding sections of this account that the fossil Musk Ox was widely distributed in Southern England, suggesting that it was probably more numerous in this region than further north. This is not surprising since most of this area probably formed part of the

periglacial zone surrounding the icesheets during Middle and Upper Pleistocene times. The Musk Ox did, at one time, range as far north as Yorkshire.

The evidence supplied by the associated faunas is remarkably consistent with the theory that the Musk Ox was adapted to cold conditions. At practically every Musk Ox locality where other mammalian remains have been found, as at Plumstead, Crayford and Ightham, there is either one or several cold climatic indicators present, the most common of these being the Mammoth and Woolly Rhinoceros. Reindeer, Arctic Fox, Marmot, Horse and Steppe Bison also occurred. The presence of most of these forms suggests, according to Zeuner, that the Musk Ox lived in the periglacial zone, in a Tundra or Loess-Steppe environment, where it was cold even during the summer and where there was a regular snow-cover during the winter. The Musk Ox would have fed on the sparse vegetation much as he does to-day.

Although the stratigraphical and faunal evidence of only a few of the localities have been discussed in any detail, there is reason to believe that the Musk Ox was confined to the cold phases of the Upper Pleistocene (Ightham) and possibly of the Middle Pleistocene (Crayford). Evidence for its occurrence in a fully interglacial deposit or in the Lower Pleistocene of England is inconclusive.

Much further research, and a reinvestigation of the other Musk Ox localities is needed to provide an adequate account of its stratigraphical range in England. It is to be hoped that further remains of this highly interesting animal will come to light in other Museum Collections or will be found in glacial deposits yet to be examined.

IV. ACKNOWLEDGMENTS

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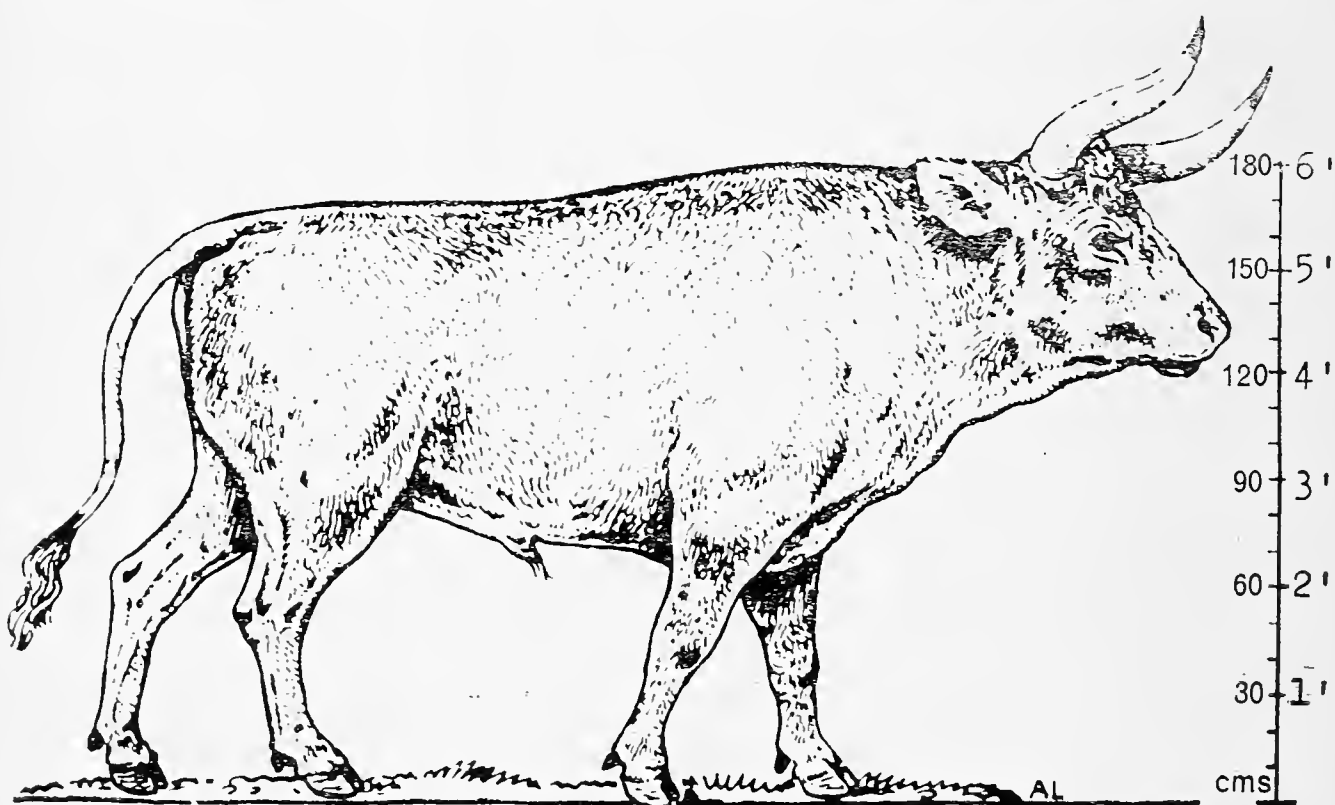
Report on the Recently Discovered Remains of the Wild Ox (*Bos primigenius* Bojanus) from East Ham

By CAROLINE BANKS, B.Sc. (*Institute of Archaeology*)

With a Report on the Pollen Analysis by J. FRANKS, PH.D. (*Manchester University Museum*)

INTRODUCTION

The now extinct Wild Cattle (urus or aurochs) were huge animals, the bulls standing up to six-and-a-half feet at the shoulder and having a horn-spread of up to about four feet; the cows were much smaller. They were present in Britain during, and after, the Ice-Age and were hunted by prehistoric man (Mesolithic man at Star Carr in Yorkshire, Neolithic man at Windmill Hill, and at many other sites). The most recent dated skeleton was found in East Anglia, near Littleport, and is from the Early Bronze Age (Shawcross with Higgs, 1961). Aurochs are thought to have died out in England towards the end of the Bronze Age, but they *may* have survived later in the highlands of Scotland. Many skulls have been found in Britain but very few have been accurately dated.



Reconstruction of an Aurochs Bull (after J. Boessneck, in Haushofer, 1961)

THE FINDS

In September 1958 part of a large skull (referred to as Skull A) was found by workmen employed by G. Percy Thetham Ltd. on the site of the New Pumping Station at East Ham Sewage Works, on the edge of Barking Creek near London, and the British Museum (Natural History) was informed. On September 22 Dr. A. J. Sutcliffe visited the site and identified the find as the back part of the skull of a urus consisting of the occipital region, both horncores and most of the frontal bones,

In August 1959, a second find (referred to as Find B) was reported to the Museum. It also came from the Sewage Works, this time from the Oaken Trough, a tributary of Barking Creek. Dr. Sutcliffe again visited the site and found another back portion of a urus skull, similarly preserved to Skull A but with less of the occipital and frontal regions intact, and with only one horncore, together with several vertebrae, ribs and limb bones, all presumably from the same animal. Although most of the bones had already been removed and were lying by the side of the trench, a rib was still present in the section.

All the bones were presented to the British Museum (Natural History) by the County Borough of East Ham through the Borough Engineer, Mr. F. C. Ball.

THE DEPOSITS

Both skulls were found deeply embedded in peat in the positions shown on the map. The sections at both sites were essentially the same but differed in detail; they both consisted of peat, overlying river gravel, and covered with silt or clay and then made-up ground. In the section at Site A the peat was mixed with river mud and the whole of this section was exposed, but Section B was only exposed to the top of the gravel and the level given for the top of the London Clay was supplied by the contractors (G. Percy Thetham Ltd.).

The land here is extremely low-lying, only three feet above O.D. and at the time when the aurochs were trapped must have been bog along the bank of Barking Creek.

DATING

Only the deposits from Site B were suitable for pollen analysis, and Dr. Franks (see following report) dates the sample from where the rib was found to the middle of the Atlantic Period (6,000-3,000 B.C.) Very few finds of Wild Oxen in Britain have been dated; only two of these are Mesolithic, the collection from the famous Boreal site of Star Carr (Frazer and King, 1954), and a broken cannon bone with a few other fragments, from Thatcham, also Boreal (Wymer, 1960).

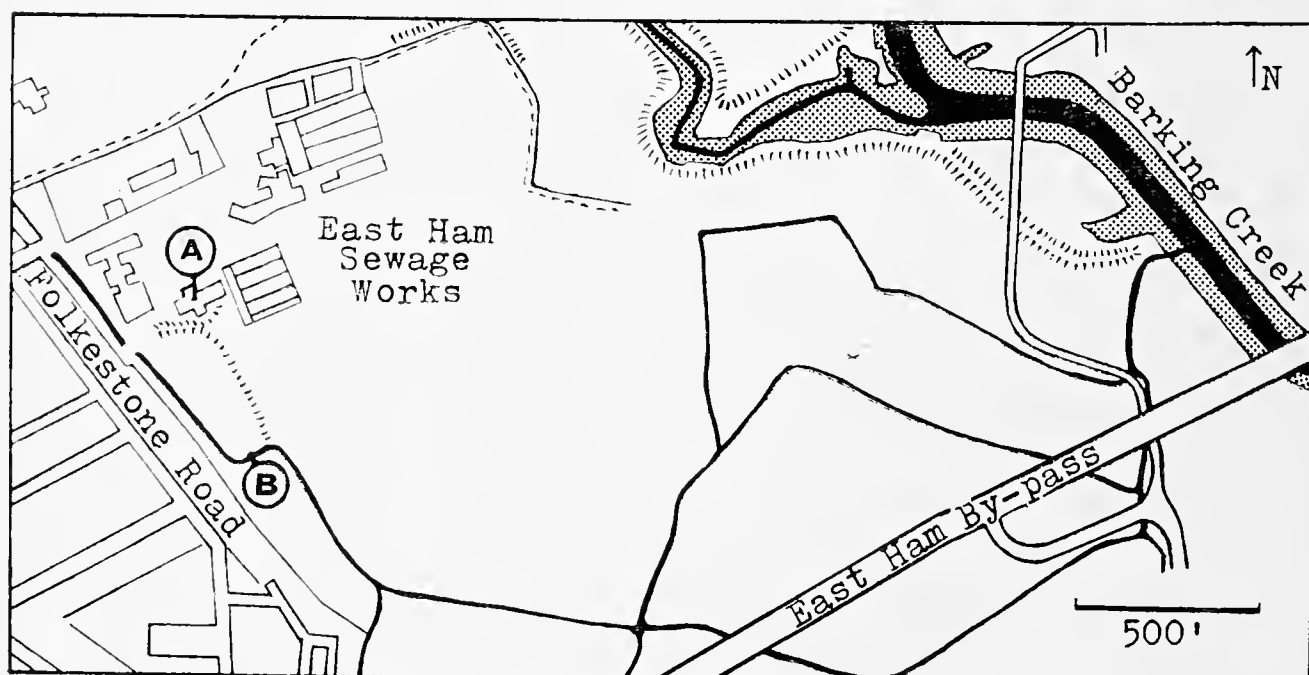
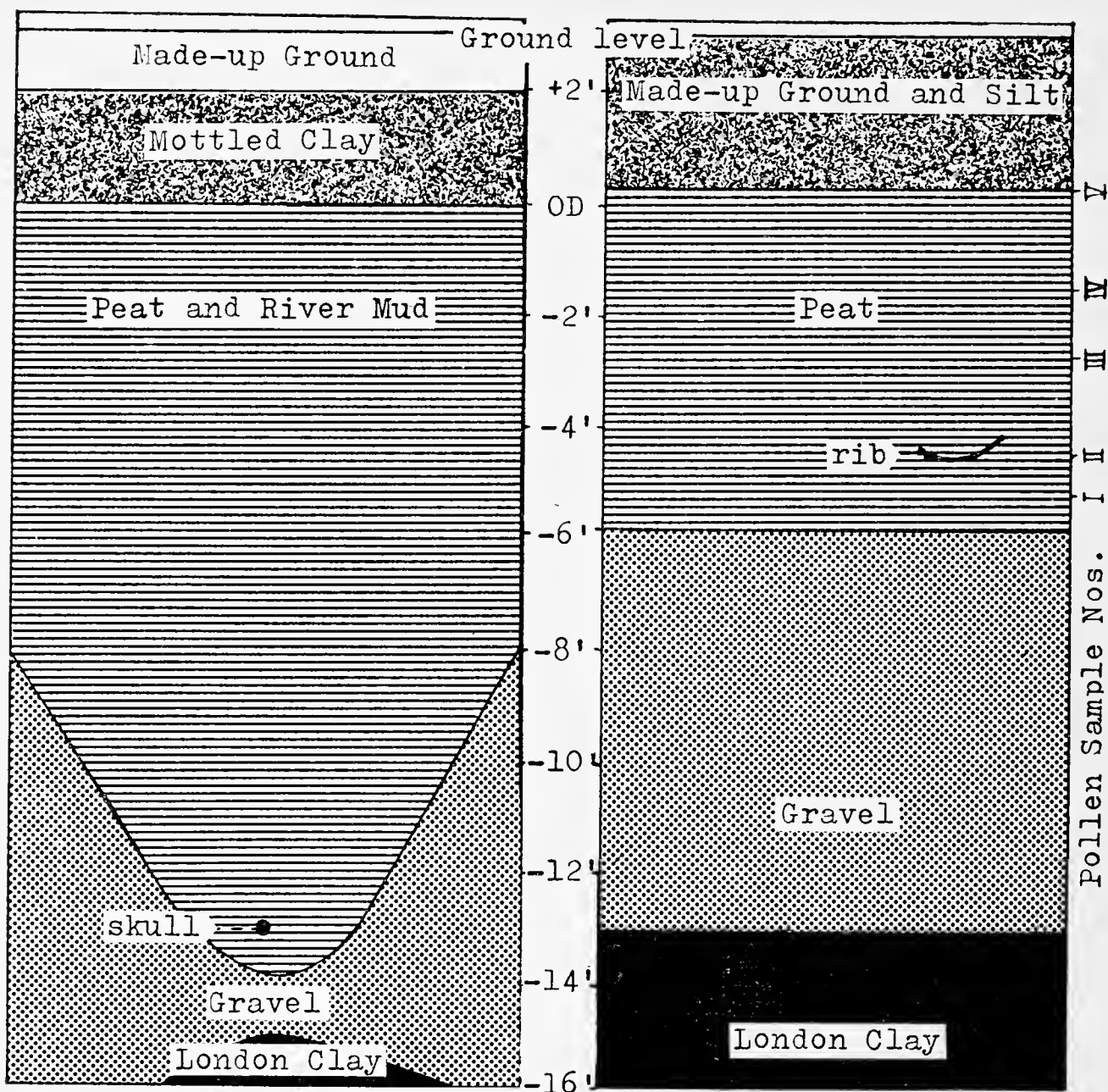
DESCRIPTION

Skull A The horncores stand out from the skull in the frontal plane and then bend forwards more or less at right angles to it, hardly rising at all above the frontal ridge.

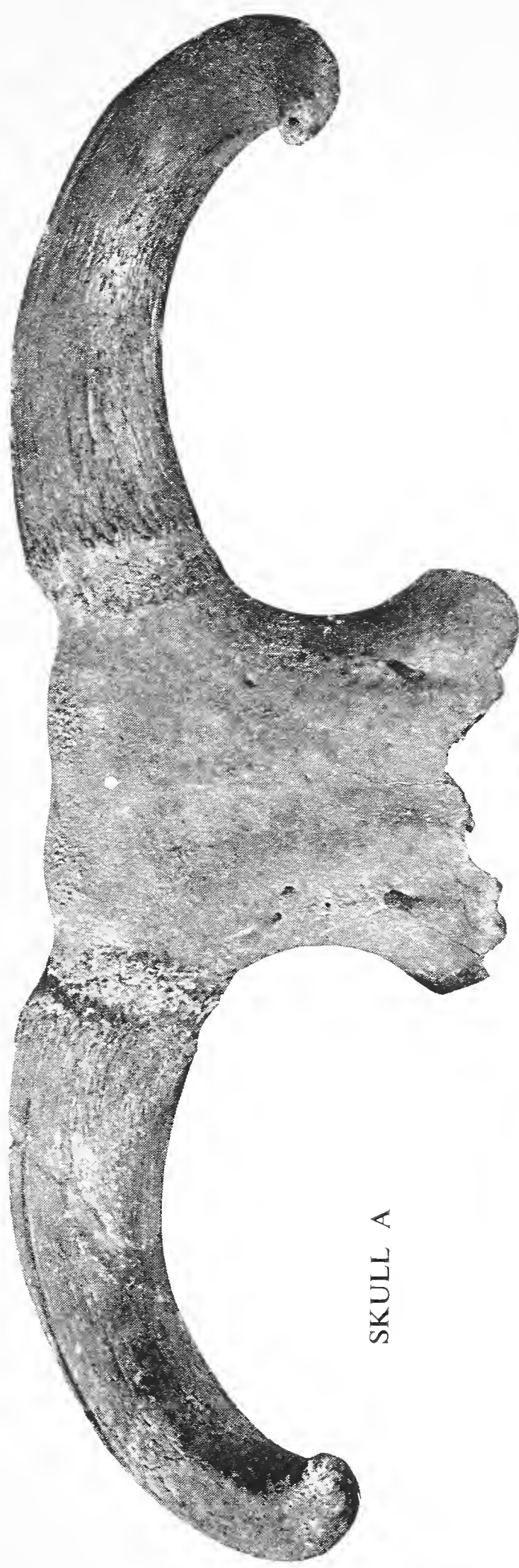
Judging from the large size and the rough bone surface this skull is that of an adult bull; the roofing over of the supraorbital grooves shows that it is well over four years old, and the suture closure indicates an age of 5-7 years.

Skull B As in Skull A the horncores stand out from the skull in the frontal plane and then turn forwards at right angles, but they rise rather higher above the frontal ridge and have a more rounded curvature.

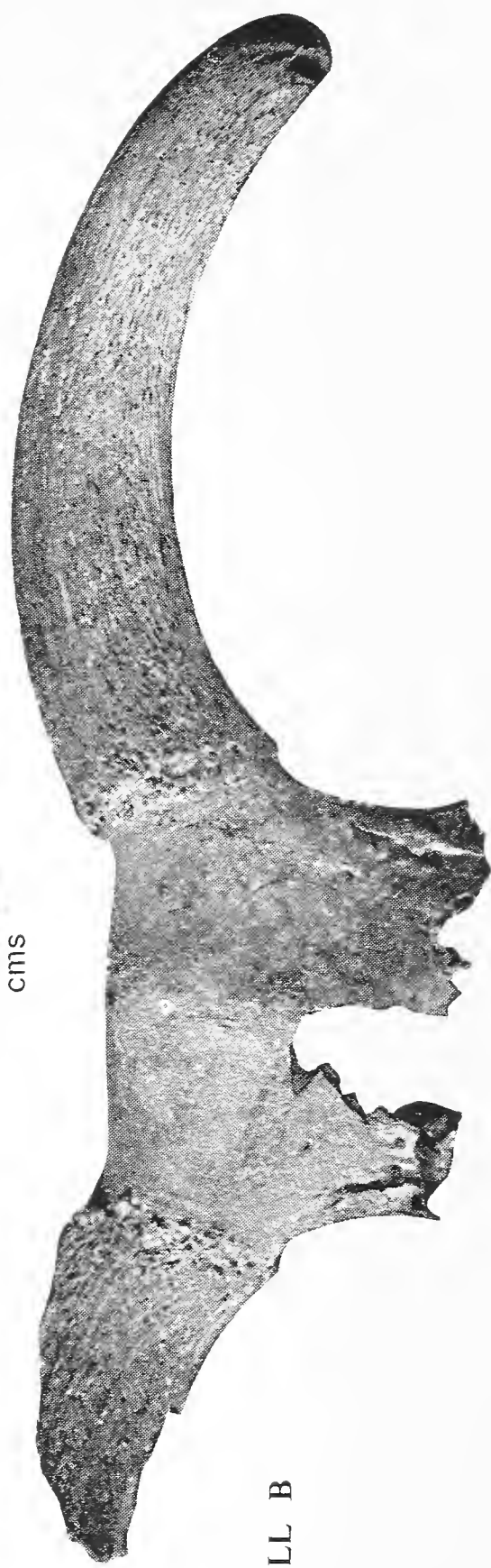
All the measurements of this skull are slightly smaller than those of Skull A, except for the breadth of the frontal bone and the distance between the openings of the temporal fossae. The supraorbital grooves are open except for one small bridge of bone showing that the animal was approximately four years old when it died; the smooth surface of the bone and the suture closure also indicate that this animal was younger than that of Skull A. Such a large skull must be that of a bull.



Sketch map showing positions of the finds



SKULL A



SKULL B

Other Bones of Find B. The epiphyses of the boney caps on the dorsal spines of the vertebrae are incompletely fused to the spines. The humerus and the radio-ulna, and the metacarpus and the phalanx can be articulated, and are presumably all part of the same leg. All their epiphyses are fused to the shafts.

SIZE

All the measurements are similar to those given by Reynolds (1939) for British aurochs, and all the skull measurements fall within the ranges given by Von Leithner (1927) for post-Pleistocene bulls.

OTHER FINDS

Some bones of other animals were heaped at the side of the trench at Site B. These are of domestic cattle, dog and sheep. It is very unlikely that these are of the same date as the aurochs' bones, but this possibility cannot be ruled out. Their relative dates have been tested by the Nitrogen method but so far the results are rather inconclusive.

ACKNOWLEDGEMENTS

I am very grateful to Dr. A. J. Sutcliffe and to J. W. Simons of the Geology Department of the Natural History Museum for all their help.

ABSTRACT

Portions of two skulls, the first three dorsal vertebrae, several ribs and bones of the foreleg of *Bos primigenius* were found in peat in the valley of Barking Creek at East Ham, near London. They are of adult bulls. Measurements of the skulls and limb bones are given, and one skull and the limb bones, which seem to be from the same animal, are dated to the Atlantic Period by pollen analysis.

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TABLE OF MEASUREMENTS

All in millimetres

	<i>Skull A</i> (B.M.N.H. M.21280)	<i>Skull B</i> (B.M.N.H. M.21281)
Length along frontal ridge between horncores	293	222
Least breadth of frontals	240	243
Greatest breadth of frontals be- hind orbits	313	—
Breadth between occipital open- ings of temporal fossae	219	228
Breadth across occipital condyles	143	—
Occipital height, from basion	248	—
Occipital height, from opisthion	190	—
Circumference of base of horncore	355	343
Length of outer curvature of horncore	735	705
Breadth from tip to tip of horn- cores	725	1,000 (est.)

Other bones of Find B	B.M.N.H. Reg. No.	Greatest length	Proximal breadth	Distal breadth
<i>Left humerus</i>	M.21290	442	152	—
<i>Left radio-ulna</i>	M.21291	—	—	104
<i>radius</i>	M.21291	381	115	—
<i>Left metacarpus</i>	M.21292	254	86	84
<i>Left inner proximal phalanx</i>	M.21293	67 (outer)	45	39

Pollen Analysis of Peat from the Oaken Trough (Section B) at East Ham Sewage Works

By DR. J. FRANKS (*Manchester University Museum*)

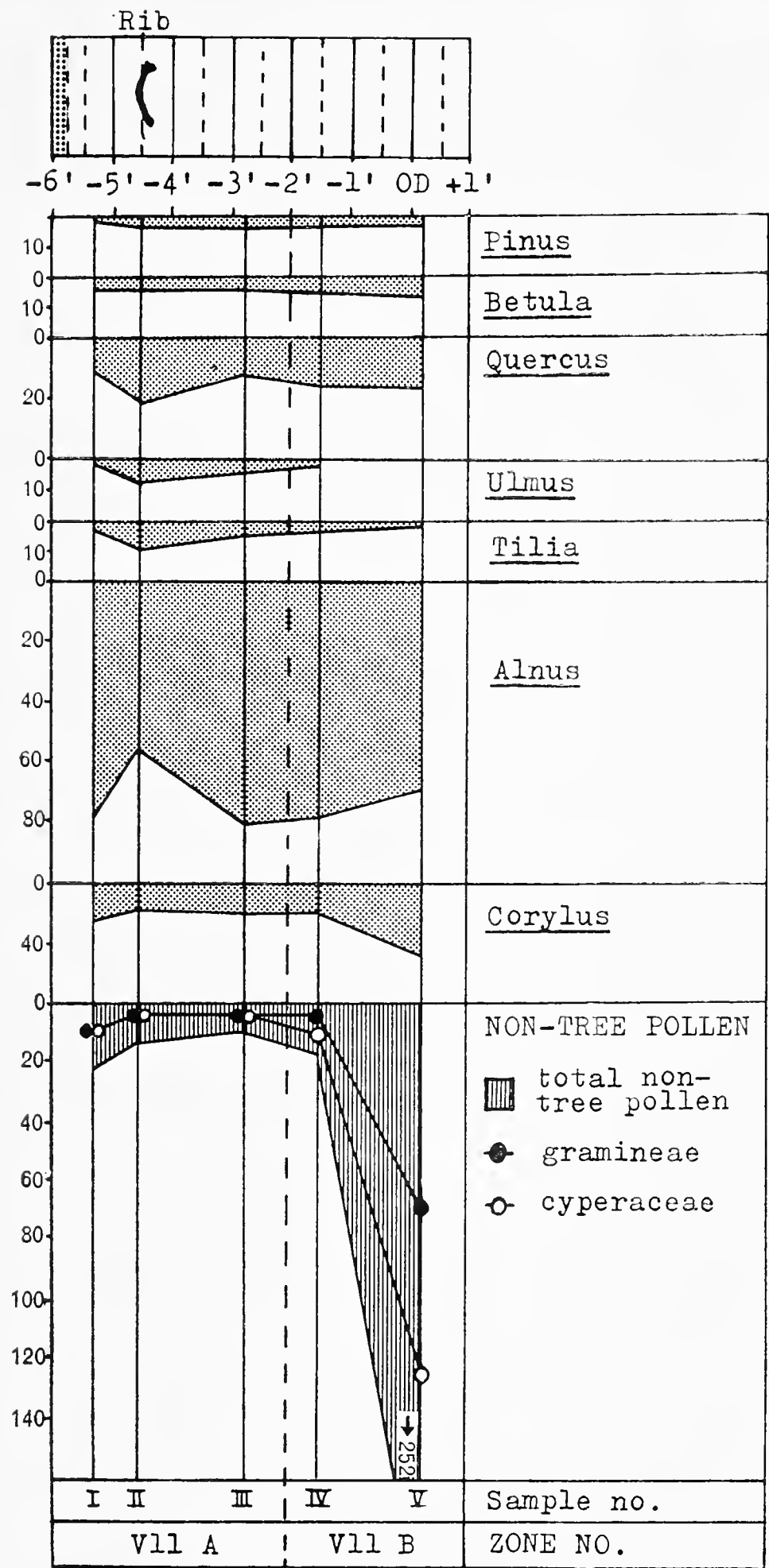
The three basal samples are characterized by the high values for the pollen of *Alnus* (alder). The only other tree pollen present in any quantity is *Quercus* (oak) with values of 16-20%. The pollen of *Corylus* (hazel) has values of 10-15% when calculated against the total tree pollen. The amount of non-tree pollen is small.

The two uppermost samples, IV and V, again show a dominance of *Alnus* in the tree pollen total, but are characterized by increasing amounts of non-tree pollen, which in sample V reach 252% of the tree pollen total.

The series of five samples covers the transition from pollen zone VIIa to VIIb. Sample II taken from the level at which the bones of *Bos primigenius* were found can be dated to the upper part of Zone VIIa.

TABLE OF IDENTIFICATIONS NOT INCLUDED IN THE POLLEN DIAGRAM

				Sample Number				
				I	II	III	IV	V
<i>Artemisia vulgaris</i>	—	—	—	—	+
Caryophyllaceae	—	+	—	—	+
Chenopodiaceae	—	—	+	—	+
Compositae liguliflorae	—	—	—	—	+
Compositae tubuliflorae	—	+	—	+	+
Cruciferae	—	—	—	—	+
<i>Filipendula ulmaria</i>	—	—	—	—	+
<i>Fraxinus</i> sp.	—	+	—	—	—
<i>Galium</i> sp.	—	+	—	—	—
<i>Hedera helix</i>	—	+	—	—	+
<i>Plantago lanceolata</i>	+	—	—	—	+
<i>P. major-media</i>	—	—	—	—	+
<i>Polygonum persicaria</i> type	—	—	—	—	+
<i>Polypodium</i> sp.	+	+	+	+	+
<i>Potentilla</i> sp.	+	—	—	—	—
<i>Pteridium aquilinum</i>	+	—	—	+	+
<i>Ranunculus</i> sp.	+	+	—	+	+
<i>Rumex acetosa</i>	—	—	—	—	+
Umbelliferae	+	+	—	—	—
<i>Viscum album</i>	+	+	—	—	—



Pollen Analysis Diagram based on Samples from the Oaken Trough, East Ham

A Review of the Lepidoptera of the London Area for 1960 and 1961

By C. G. M. DE WORMS, M.A., Ph.D., F.R.I.C., F.R.E.S.

WHEN in 1959 the Supplement to the "Butterflies and Moths of London and its Surroundings" was completed, I mentioned that I hoped that *finis* was not written on a work that had embraced such a wide area and so much scope. I am therefore glad to say that it has now been deemed advisable that a review of this group of insects should be undertaken from time to time, possibly biennially. In this way those interested can be kept *au fait* with the trend either of abundance or relative absence of species and also with the addition of any new ones to the Area and to the respective Vice-Counties.

I have considered that perhaps the best way to present these features would be to cover the past two years in comparison as regards weather, time of appearance of various species, and their relative plenty or otherwise in different regions and also to incorporate any Vice-County records of special interest including several for some of the years covered by the main work. In the subsequent paragraphs species entirely new to the Area are designated in heavy type, while those new to the Vice-County areas are indicated by an asterisk.

After the phenomenal summer of 1959, those of both 1960 and 1961 were somewhat of an anticlimax as regards warmth and periods of sunshine; in fact the summer period of 1960 is generally regarded as one of the worst in recent years, though that of 1961 made some amends. Mild winters preceded both seasons. For 1960 the summer itself did not produce any exceptional periods of heat, while its last three months were some of the wettest on record. It was generally regarded as a poor season for the lepidoptera, though such a migrant as *Herse convolvuli* L. (the Convolvulus Hawk) was more plentiful in the autumn than for many years. The year 1961 opened with a very early season for insects with many kinds appearing in March and April several weeks ahead of normal, but a very bleak May soon evened out this precocious start. There were several warm periods in the summer months with one at the beginning of July touching the 90's, while September and early October were among the best early autumns of recent years. It was this period that brought quite a flood of migrant species, the most outstanding of which was the capture of just over 30 *Utetheisa pulchella* L. (the Crimson-speckled Footman) which is more than has been recorded for any single year this century in this country, and we have to go back to 1892 for a comparable figure. Two other migrant species were unusually numerous, *Leucania vitellina* Hübn. (the Delicate) and *Rhodomestra sacraria* L. (the Vestal) in the autumn. All these three rare insects found their way into the London Area and most of their dates and locations of capture will be enumerated below. Coming now to special records for the Area during 1960, the year was most notable for the reappearance in numbers of that delightful little butterfly *Celastrina argiolus* L. (the Holly Blue). Both the spring and summer broods were more plentiful than for many years and they were to be seen flitting round bushes and flowers in many suburban gardens and even observed in the centre of the Metropolis. But two most unexpected and remarkable visitors were males of *Itame brunneata* Thunb.

(the Rannoch Looper) which as its name implies, is normally found among large growths of Bilberry in the Highlands, but in 1960 six other examples were recorded, all in the south-east of England or the Home Counties and they were much larger than the normal Scotch form. The inference has been drawn that this was part of a migration probably from the Ardennes, since this insect has the knack of turning up occasionally in the south of England. Of the two individuals in question captured in the Area one appeared in the moth-trap of Professor J. V. Dacie at Wimbledon on the night of 25 June, while the other found its way into a similar apparatus run by Sir Eric Ansorge at Chalfont St. Peter on the western boundary of the Area on the night of 27 June. All the other captures were made during this period (*vide Ent. Gaz.*, 11, 184).

During 1961 several new localities in the Area were discovered for *Thymelicus lineola* Ochs. (the Essex Skipper), notably near Feltham, Hounslow and at Coulsdon. It is probable that it is much more widespread and that many more spots for it will turn up in due course. It would well repay looking specially for this little butterfly, even in fairly built-up areas. Returning to the remarkable migrants in the latter end of the year, of the two *U. pulchella* L. (the Crimson-speckled Footman) taken within the London region one was captured in the garden of Mr. Bryan Wheeler-Holdham at Lee on 30 August (*vide Entom.*, 94, 285), while the other was found flitting by Mr. Clifford Edwards on the lawn by his house near Westerham on 1 October. He fortunately suspected it was a female and after much coaxing, it laid about 20 eggs which proved fertile and from this batch he bred out a series in December, probably the first from a specimen of British origin, and these are being carried on for a second generation (*vide Ent. Rec.*, 74, 9). The last example of this insect to be taken within the Area was at Rickmansworth in 1949. Other captures of rare visitors included a *Leucania vitellina* Hübn. at Northwood in September, 1961, and an example of *Leucania albipuncta* Fab. (the White-point Wainscot) on 26 June, 1960, at Totteridge by Mr. R. Lorimer. There have apparently been only two records for each of these species previously. During both years *Caradrina ambigua* Fab. (Vine's Rustic) has been unusually plentiful in the Area, and there have been many reports of the little migrant moth *Nycterosea obstipata* Fab. (the Gem). But for the period under review the common migrant butterflies, such as *Pyrameis cardui* L. (the Painted Lady) and *Colias croceus* Fourc. (the Clouded Yellow) have been exceptionally scarce and virtually only a handful of the former and none of the latter reported within the London limits.

But a most sensational capture for the region came to light in 1960. At the Annual Exhibition of the Amateur Entomologists' Society there was shown an apparently abnormal example of *Hypena rostralis* L. (the Buttoned Snout), but as soon as some experts saw it they at once recognized it must be a different species and the specimen was ultimately identified at the British Museum (Natural History) as an allied species ***Plathypena scabra*** Fab., a common insect over the whole of North America. It had been taken by Mr. C. G. Bruce near Lee, Kent, on 31 August, 1956, and was, of course, also an entirely new addition to the British List (*vide Ent. Gaz.*, 11, 194).

Turning to the more interesting records for the individual Vice-County regions and starting with MIDDLESEX (M.21), for the Hounslow district Mr. C. W. Pierce reports for 1961 several species he had not seen

before in his immediate neighbourhood and which had not apparently been noted before from it. With *Thymelicus lineola* Ochs (the Essex Skipper), already referred to, the list is headed by *Hyloicus pinastri* L. (the Pine Hawk) of which few examples seem to have penetrated this part of the Area. Also *Leucoma salicis* L. (the White Satin), though sometimes abundant in many other districts has seldom been noted in the westerly regions. Both *Hadena suasa* Schiff. (the Dog's Tooth) and *Apamea unanimitis* Hübn. (the Small Clouded Brindle) and *Amathes glareosa* Esp. (the Autumnal Rustic) appear to be uncommon in the locality. Two other most noteworthy captures were *Cucullia absinthii* L. (the Wormwood Shark) which seems to be increasing its range every year and in early October *Cirrhia ocellaris* Borkh. (the Pale Lemon Sallow), also quite new to this part of Middlesex, as also were examples of *Scopula immutata* L. (the Lesser Cream Wave), *Ellopiia fasciaria* L. (the Barred Red) and *Gnophos obscurata* Schiff. (the Annulet), all taken there in 1960. Three of this last species were also taken in August, 1959, by Mr. E. W. Classey not far off, at Feltham. During that year he also obtained a good many species not previously recorded for this part of Middlesex. These included the two Kittens, *Cerura hermelina* Goeze (the Poplar) and *C. furcula* L. (the Sallow Kitten). In July 1959 he also had at his light *Gastropacha quercifolia* L. (the Lappet) and *Drepana binaria* Hufn. (the Oak Hooktip) as well as *Cybosia mesomella* L. (the Four-dotted Footman,) seldom noted in the county. Among the Noctuids that year were *Apatele leporina* L. (the Miller) and *Polia tinctoria* Brahm. (the Silvery Arches) and of particular interest to the Area on 27 June was his capture of *Hadena contigua* Vill (the Beautiful Brocade)*, new to the Middlesex list. *Amathes glareosa* Esp. (the Autumnal Rustic) had not been seen before in that part of the county nor had *Nonagria geminipuncta* Thunb. (the Twin-spotted Wainscot), only previously reported from the Hammersmith Marshes. *Lygephila pastinum* Treits. (the Blackneck) was also new to this locality (*vide Ent. Gaz.*, 11, 190). Mr. Classey also took *Herse convolvuli* L. (the Convolvulus Hawk) at Feltham on 25 September, 1960 (*Ent. Gaz.*, 11, 203). From another quarter of MIDDLESEX, Mr. B. Goater reports the capture of *Nycterosia obstipata* Fab. (the Gem) at Mill Hill on 9 September, 1961.

For HERTS (H.20) Mr. Goater notes the presence of larvae of *Strymonidia w-album* Knoch (the White-letter Hairstreak) on Wych-elm during 1961 in the Whippendell woods which also produced again a few specimens of *Gypsitea leucographa* Hübn. (the White-marked) on sallow in the spring of 1960. Larvae of that very local species *Eupithecia inturbata* Hübn. (the Maple Pug) were common on Maple flowers in that region in May of that year. From the Totteridge area besides the specimen of *Leucania albipuncta* Fab. (the White-point Wainscot)* taken on 26 June, 1960, Mr. R. I. Lorimer also records two examples of *Spaelotis ravidata* Hübn. (the Stout Dart) taken in September, 1960, and again in this month of 1961. An unusually common insect in August, 1960, was *Caradrina ambigua* Fab. (Vine's Rustic) which reappeared equally plentifully at the same period in 1961. Another interesting capture for this area was *Euphyia cucullata* Hufn. (the Royal Mantle) on 26 July, 1961. Nearby at Arkley Mr. T. G. Howarth took a *Rhodometra sacraria* L. (the Vestal) on 31 August, 1961, and a remarkable somatic mosaic of *Agrochola lychnidis* Schiff. (the Beaded Chestnut) on 23 September, 1961, having the left side much darker than the right. A specimen he took early in 1961 of *Conistra vaccinii* L. (the Common Chestnut) was also this type of aberration, but with a darker side on the right.

Also in this vicinity Mr. P. Ward ran a m.v. trap regularly during the seasons of 1960 and 1961 in his garden at Whetstone and made a number of interesting captures in it, many of which had not been noted before in that part of the county. *Deilephila porcellus* L. (the Small Elephant Hawk) was a novelty as also was a dark form of *Stauropus fagi* L. (the Lobster), both appearing there in July, 1961. *Leucoma salicis* L. (the White Satin) and *Drepana binaria* Hufn. (the Oak Hooktip) were apparently new to the district, while a notable visitor on 2 August, 1960, was a specimen of *Spaelotis ravidia* Hübn. (the Stout Dart). Other Noctuids of note included *Hadena suasa* Schiff. (the Dog's Tooth) of which very few records are extant for that part of Herts, also *Eumichtis adusta* Esp. (the Dark Brocade) taken in June, 1961. *Aporophyla lutulenta* Borkh. (the Deep-brown Dart) obtained in September, 1961 and *Celaena leucostigma* Hubn. (the Crescent) taken on 1 August, 1960, both seem rarities for this region, while further examples of *Hydraecia paludis* Tutt (the Saltern Ear) appeared in both years. Few *Caradrina ambigua* Fab. (Vine's Rustic) seem to have been recorded for this part of the county, but they were in abundance in the late summer of 1961 in this locality. *Orthosia advena* Schiff. (the Northern Drab) taken in May, 1961 and *Parastichtis suspecta* Hübn. (the Suspected) in July, 1960, seem to have been previous absentees from this region. A species to reappear was *Cucullia absinthii* L. (the Wormwood Shark) with one capture in 1960 and two in 1961. *Pyrrhia umbra* Hufn. (the Bordered Sallow) and the even more handsome *Plusia festucae* L. (the Gold-spot) were both visitors in 1960 with three of the former again in 1961. The latter was new to this part of the county. Also not reported before were *Comibaena pustulata* Hufn. (the Blotched Emerald) and *Acasis viretata* Hübn. (the Yellow-barred Brindle), taken in August, 1960. A rare Pug, *Eupithecia innotata* Hufn. (the Angle-barred Pug), was an unexpected visitor and there were some interesting melanic forms among the Geometers, notably ab. *fusca* of *Erannis marginaria* Borkh. (the Dotted Border), also a good many of the dark form of *Hemerophila abruptaria* Thunb. (the Waved Umber), while the black varieties of *Cleora repandata* L. (the Mottled Beauty) were increasingly numerous during the period. Mr. Ward also took an extreme f. *costovata* of *Xanthorhoë fluctuata* L. (the Garden Carpet).

There do not appear to be any records of special note recently for the ESSEX Vice-County areas (E2.18 and E1.19).

For KENT (K.16), too, nothing of particular note during the past two years has been reported, apart from the two *Utetheisa pulchella* L.* already referred to and the *Plathypena scabra* Fab.* taken in 1956, but two captures for this region have come to light latterly of very special interest, both taken by Mr. W. A. Cox. The first is a melanic form of *Asphalia diluta* Schiff. (the Lesser Lutestring) obtained on Plumstead Common in 1956. It has been named *melanorufa* by Mr. Chalmers Hunt and is an entirely new form of this insect which has since then also been taken on the Surrey-Sussex border. The other is a remarkable aberration of the common moth *Leucania conigera* Schiff. (the Brown-line Bright-eye) with cross-lines and other markings virtually absent from the forewings. This specimen was taken in Lessness Abbey Woods in 1949 and has been named *coxi* after its captor. (*vide Entomologist*, **94**, 281.)

In SURREY (S.17) there have been a number of records worth mentioning. Among the butterflies the discovery of *Thymelicus lineola* Ochs. (the Essex Skipper)* near Coulsdon by Mr. A. S. Wheeler during July and

August 1961 was a notable addition to the list for the county. Also a *Pyrameis cardui* L. (the Painted Lady) was observed in a garden at New Malden on 7 October of that year (*vide Entom.*, **94**, 286) in a season when this species was especially absent from most areas of Britain.

As already mentioned, Professor J. V. Dacie was running his m.v. trap on most favourable nights during 1960 and 1961 near Wimbledon Common and his most remarkable capture in it was the *Itame brunneata* Thunb. (the Rannoch Looper)* noted above. Among the Noctuids a surprise capture in 1961 was *Amathes stigmatica* Hübn. (the Square-spot Clay), only once before recorded from this part of the Area, as also was *Hadena conspersa* Esp. (the Marbled Coronet) which reappeared in 1960. *Heliophobus reticulata* Vill. (the Bordered Gothic) was another unusual visitor in 1959, while *Celaena leucostigma* Hübn. (the Crescent) was new for the district in 1960. *Cucullia absinthii* L. (the Wormwood Shark) also turned up again that year. *Aporophyla nigra* Haworth (the Black Rustic) found its way into the trap in 1959 and 1961, the nearest records to Central London. *Jaspidia pygarga* Hufn. (the Marbled White-spot) taken in 1961, does not appear to have been noted before for Wimbledon, nor has *Colocasia coryli* L. (the Nut-tree Tussock), also captured that year.

Of the Geometers recorded by Professor Dacie the presence of *Hemistola immaculata* Thunb. (the Small Emerald) in 1959 is new to the local list, while *Horisme vitalbata* Schiff. (the Small Waved Umber) in 1960 is of special interest as being a long way from its normal habitat on downs where the Travellers' Joy flourishes. Melanism was also prominent during the two years in the Family, notably with an ab. *fuscata* of *Hemerophila abruptaria* Thunb. (the Waved Umber) in 1960, and a black *Lycia hirtaria* L. (the Brindled Beauty). This was a year also in which the proportion of melanic *Pachys betularia* L. ab. *carbonaria* Jordan (the Peppered Moth) was no less than 82%. *Hepialus fusconebulosa* Deg. (the Map-winged Swift) was another addition to the Wimbledon fauna in 1960.

From the southernmost point of the Area at Bletchingley Mr. B. Hancock reports several interesting captures during 1960, notably *Argynnis aglaia* L. (the Dark-green Fritillary) and *Strymonidia w-album* Knoch (the White-letter Hairstreak) from Poundhill Wood near there in the last week of July and *Lysandra coridon* Pod. (the Chalk-Hill Blue) from White Hill in that neighbourhood. Several Geometers had not previously been noted in that district. These included *Lygris pyraliata* Schiff. (the Barred Straw) taken in Poundhill Wood, *Plemyria bicolorata* Hufn. (the Blue-bordered Carpet) and *Perizoma flavofasciata* Thunb. (the Sandy Carpet), both taken at Godstone and also *Eupithecia pulchellata* Stephens (the Foxglove Pug) obtained in the larval state also at Poundhill Wood on 25 June.

From the last Vice-County area, BUCKS (B.24) Sir Eric Ansorge reports a good many species new to his headquarters at Chalfont St. Peter. Several of these insects are new to that part of the London Area. *Odontosia carmelita* Esp. (the Scarce Prominent) was a welcome newcomer in 1961 and *Eilema sororcula* Hufn. (the Orange Footman) in 1960 in which year he also took *Apamea unanimitis* Hübn. (the Small Clouded Brindle)*, new to B.24 as also was *Caradrina ambigua* Fab. (Vine's Rustic)* which was numerous both seasons. Other additions in 1961 were *Orthosia miniosa* Fab. (the Blossom Underwing)* *Hepialus fusconebulosa* Deg. (the Map-winged Swift)*, also *Thera variata* Schiff. (the Spruce Carpet)* and *Horisme vitalbata* Schiff. (the Small Waved Umber)*.

plentiful in May, 1960. Other somewhat scarce species for the district which reappeared in these two seasons included *Mitochondria miniata* Forst. (the Rosy Footman) in 1961, also *Gypsites leucographa* Hübn. (the White-marked), one for each year, and *Dicycla oo* L. (the Heart Moth) with two in 1960. *Selenia lunaria* Schiff. (the Lunar Thorn) was recorded singly each year and *Ectropis extersaria* Hübn. (the Brindled White-spot) with one specimen in 1961. Finally there is the outstanding record of *Itame brunneata* Thunb. (the Rannoch Looper) which appeared in late June 1960 and to which reference has already been made.

To summarize the latest figures, the additions for the last two years, 1960 and 1961, bring the total number of species of the Macrolepidoptera for the London Area to 720. With the Grand Total of recognized and valid species for the whole of the British Isles standing at 919 up to the end of 1961, this makes the proportion at 78·2% a very high one for which London can justly be proud.

Insects of Some Common Weeds at Chiswick

By R. W. J. UFFEN

THE author wrote in this journal (Uffen, 1959) about some of the more unusual insect inhabitants of the strip of Thames-side between Chiswick Bridge and Barnes Bridge. Most of these have now been eliminated following the decision of the local authority's Parks Committee that only grass and alien shade trees should be allowed to grow on such public open spaces. The eroded bank beyond the fence near the river's edge has so far been spared the mower, only winter clearance being carried out last year, but this does not appear to have saved the saw-fly *Tenthredo omissa* (Forster) or other insects. The only redeeming feature has been the planting of young hawthorn along almost the whole length of the area against the fence dividing the road from the adjacent allotments. The breadth available unfortunately seems scanty for the development of a full hedgerow community of plants, and no doubt the existing coarse vegetation will in time be crowded out.

Because of the above set-back, local collecting in the spring and early summer of 1961 was transferred to a path between the railway embankment adjoining Barnes Bridge and the grounds of a factory. Weeds still penetrate beneath the tall, all-concrete fence recently erected here and flourish on the path. The final blow came in July when the annual cutting of these plants took place the day before the author went to forestall precisely this calamity by collecting plants on which insects had been seen ovipositing. A householder whose derelict garden harboured the main reservoir of *Chenopodium album* L. (Fat Hen), on which there are particularly interesting insects here, was approached, but showed the resentment of a flower-show prize-winner at his weeds being noticed. That the writer could have an interest in some invisible animals on them was beyond credulity. The whole crop was offered with a wild gesture of a car-spanner and it appeared that diplomatic channels had once more proved inadequate as a means of obtaining the assistance of exponents of different ideologies. But the naturalist is as persistent as his weeds, and infiltration methods were applied in the neighbourhood with great success.

The grounds of the factory alluded to above consist mainly of allotments, now mostly in various stages of dereliction. Soil dumped from the foundations of a number of houses recently built on a part of the area fostered an even more luxuriant growth of Fat Hen than the neighbour's garden. Along the path outside two species of Coleophoridae had been observed laying eggs on the florets of this plant after dark and one specimen of a third species, *Coleophora clypeiferella* Hofmann had been swept. The Coleophoridae, Psychidae and a few other families replace the caddisflies on land in that they have caterpillars which live in portable cases made from silk and often from fragments of the plant on which they are feeding, but these are families of moths. The British species of Coleophoridae known on Fat Hen attack the flowers and seeds, but *C. clypeiferella* has only been recognized in Britain from about half-a-dozen records of single moths taken in light traps in the last few years. A careful search revealed innumerable cases, presumably of this species, at a time when the conspicuous tubular silken cases of the other two species were disappearing from the plants as the larvae went down to overwinter on the

ground. The cases of *clypeiferella* are simply clumps of ripe florets which have been bored through the middle as they grew, lined with silk and cut off below. Larvae of *Scrobipalpa seminella* Pierce and Metcalfe were spinning much larger tubes between, rather than through the clumps of florets. These are never made into portable cases.

The main stimulus to collect locally in 1961 was to procure readily available supplies of various Coleophoridae. The following have so far been noted. *Coleophora argentula* Steph. was common on seeds of Yarrow, *Achillea millefolium* L. It has been sought in vain in Chiswick before and seems to have been particularly common everywhere this season. *C. peribenanderi* Toll and another species make long, pale, tubular cases and mine the leaves of the thistle, *Cirsium arvense* (L.) Scop. in autumn, attaching the case to the underside of the leaf with silk, boring in and eating out as much of the parenchyma as can be reached without leaving the case, before detaching the case and moving on again. The blotch mines so produced are characteristic of the family, being full depth (hence pale in colour), without excrement (which the caterpillar ejects through flaps maintained for the purpose at the tail end of the case), and with a round hole in the underside where the case has been attached. *C. peribenanderi* completes its growth in the autumn, whilst the other species (whose identity remains in doubt) overwinters when small and also attacks other Compositae (here *Achillea millefolium*, and occasionally Burdock, *Arctium minus* Bernh. and Mugwort, *Artemisia vulgaris* L.).

C. artemisicolella Bruand attacks the seeds of *Artemisia vulgaris*, using the first seedhead attacked as a case which it sticks on the side of those subsequently invaded, rendering detection most difficult. *C. lineolea* Haw. mines the leaves of Black Horehound, *Ballota nigra* L., but in this species the case is made from fragments of mined leaf cuticle of increasing width added at the oral end as the larva grows. The young larva has been observed to emerge through the base of the egg directly into the leaf, when it makes a short linear mine containing excrement before it cuts its first tiny case from a broader end to this mine.

A few examples of the beautiful, purplish, metallic-coloured Adelid moth *Nematois fasciella* F. were noted flying in sunshine over the Black Horehound. Larvae were obtained by sleeving a female on plants in the author's garden. This is very likely to be a new county record for Middlesex. The insect is recorded only for Kent, Essex and Surrey in Meyrick (1928). The Adelids are also case-bearers. Perhaps the most familiar is the greenish-golden *Adela viridella* Scop. seen in oak-woods in spring. Larvae of this genus feed on dead leaves on the ground. The young larvae of *N. fasciella* feed on the unripe seeds of *Ballota*, then make flat cases of silk constricted in the middle to a fiddle-shape and drop to the ground. After the winter they eat holes in the leaves.

Artemisia vulgaris is one of the most frequented host-plants amongst the available Compositae so far as insects are concerned, but it has not been systematically collected from. In the area under discussion some plants were stunted in 1961 and their apices were spectacularly galled, what should have been the inflorescence being replaced by small fleshy lobes coloured like ripening sloes. Barnes (1949) describes such galls as being produced by Cecidomyiid flies but says that until the type material of the species described is re-examined determinations must remain conjectural. Another gall midge feeds up within a single swollen seed. The insects mentioned for this plant in the author's previous note

also occur here. *Leucospilapteryx omissella* Staint. makes reddish bladder-mines in the leaves, and Trypetid and Agromyzid flies also mine the leaves. The rootstocks are ravaged from without by the caterpillars of Swift moths and from within by *Epiblema foenella* L. and probably by *Dichrorampha simpliciana* Haw. The plants still manage to grow vigorously and be dominant in places, but a detailed mapping of the rootstocks would surely show many crippled plants.

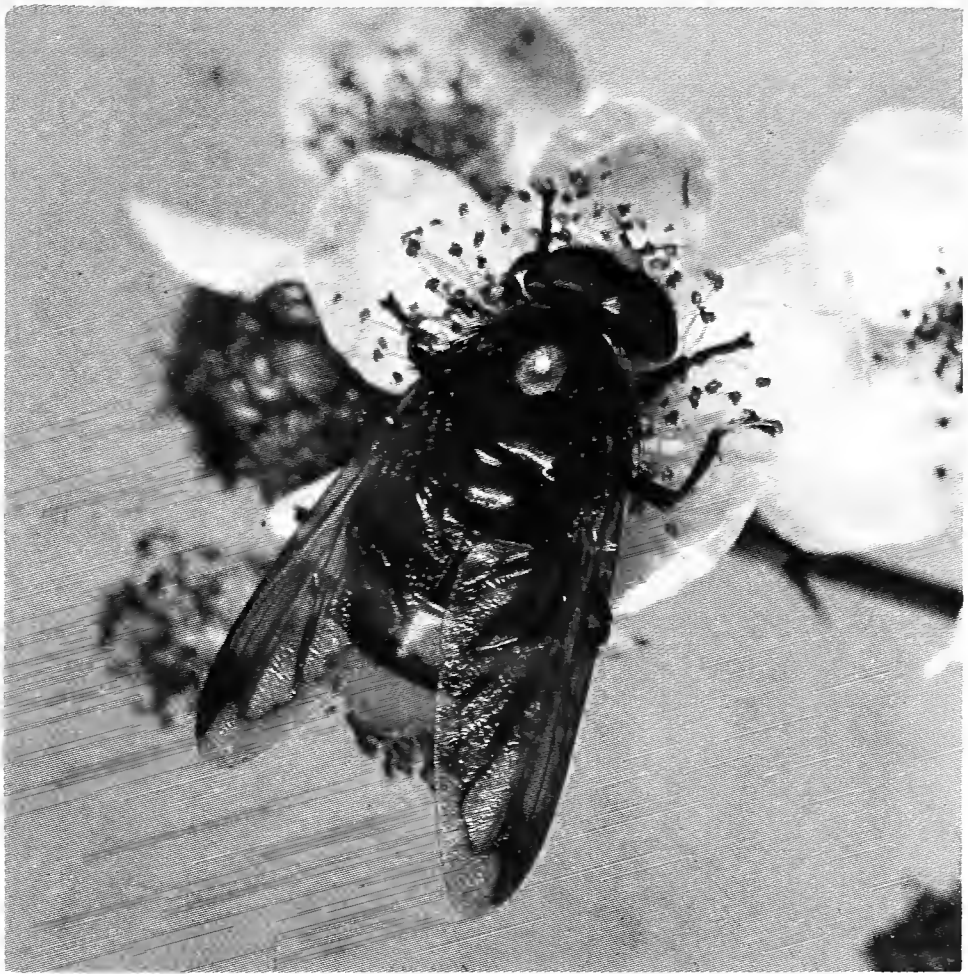
One example of the Plume moth *Leioptilus lienigianus* Zell. was disturbed after dark one evening, but as it feeds up in the spring it has not yet been useful to look for the larvae, which are known to make tents from groups of leaves of Mugwort. According to some books it may also attack such diverse plants as *Solanum* and *Chrysanthemum*. The insect is a very local one with predominantly a south-coast and east-coast county distribution and has probably not been recorded from so near Central London before. Presumably it has spread from Essex in the same way as *Ostrinia nubilalis* Hübn. (vide Uffen 1959).

By Chiswick Bridge the author has long been aware of a verge where most of the *Artemisia*, whilst looking like young Mugwort, failed to grow to the normal height or to produce the normal branches and inflorescence. Disease or malnutrition was presumed to be the cause, but the long, mild autumn of 1961 induced these single spikes to flower amongst their prolific foliage, and it at once became evident that a different plant was involved. It is the alien *A. verlotorum* Lamotte and the colony is reported in the *Hand list of plants of the London area*. Mr. J. E. Lousley kindly confirmed my identification. This plant is attacked by few insects. The leaf-miners are rarely found on it. *Paroxyna misella* Loew never galls it in the spring. The plant flowers in October if at all, so oviposition by the normal Mugwort seed-eaters is ruled out. The stems are little affected by *Ostrinia nubilalis*, but the roots have not yet been checked for damage.

There is a succession of moths of the root-feeding Tortricid genus *Dichrorampha* throughout the season over various parts of this area. These have not been systematically collected and identified. There has been some false synonymy in the standard works which renders casual identification unreliable. Early efforts at determining material from Duke's Meadow suggested a species which feeds on *Chrysanthemum*, which does not grow there. The factory grounds, only a playing field away, are now seen to have flourishing perennial marguerites in the derelict allotments, which throws an entirely new light on this little puzzle. It is hoped to obtain reliable identifications of the species present next year.

Cirsium arvense has already been mentioned. It has not been investigated at all, but the depredations of the tortoise-beetle *Cassida rubiginosa* Müll. and the large stem-swelling caused by the larvae of the Trypetid fly *Urophora cardui* L. are obvious enough. The seeds of *Arctium minus* are attacked by several insects, including the Gelechiid moth *Metzneria lappella* L., the Tortricid *Phalonia rubigana* Treits. and two Trypetid flies. The stems are bored by *Myelois cribumella* Hübn., a handsome white Pyralid moth with black spots. Thistles are said to be the preferred food-plant, but no borings have been noted on them here.

A midnight sally through the area on one warm night revealed at least one insect on every flowerhead of burdock. There were numerous



Volucella zonaria (Poda.)



Geometrid and Noctuid moths, but mosquitoes were the principal visitors, an odd sight which discouraged collecting.

Phtheocroa rugosana Hübn., an extraordinary little moth with multi-coloured tufts of scales standing erect on the wings, used to be taken from White Bryony, *Bryonia dioica* Jacq. protruding through the old wooden fence. The replacement of the fence may have killed the plant. The insect is a secretive species and is not much recorded on that account.

The bindweeds *Convolvulus arvensis* L. and *Calystegia* are of course plentiful. The plume-moths *Pterophorus pentadactylus* L. (the familiar pure white species) and *Emmelina monodactyla* L. thrive on them and the tiny leaf-mining moth *Bedellia somnulentella* Zell., so called from its resting attitude, can be abundant at times. The last two insects overwinter as adults and so are very sensitive to clearance of dead vegetative shelter during the winter. The abundant *Anthophila fabriciana* L. whose caterpillars eat nettles, visits the flowers of *Calystegia* in sunshine, but these do not seem to be very attractive to moths after dark.

A few other plants in the factory grounds worthy of future attention may be noted. There is a double hedgerow, now uncut, of hawthorn one side and plum the other, which is probably a relic of the time 40 years ago when this area was farmed. The brambles appear to be wild, rather than cultivated forms. They were suddenly attacked by a sawfly of the genus *Metallus* in 1961, every leaf having several blotch mines. Nettles of course abound, but are not a food plant of many insects of groups which interest the writer. A row of Black Poplars probably provides food for the Stag-beetles which used to be seen when a lot of dusking was done on the adjacent path. Numerous insects attack these trees (Uffen, 1962). Grasses are plentiful but appear to be more rural than the weed species which one would expect if the area had been intensively cultivated on an allotment pattern. Grass-feeding insects are a study in themselves, and nothing has been done to inaugurate the heavy programme of observation which this would require.

Any entomological account of an area must be biased strongly towards the writer's favourite group, which is obviously Microlepidoptera in the present instance. Some readers may regret that no Macrolepidoptera are noted, but light traps will probably already have given them an idea of the unexpected species which may be found in such places, even if they have not been spurred to locate whence these insects have come. Other orders have been left aside simply for lack of time, but anyone interested in them will surely see that the unpromising appearance of urban waste ground probably conceals substantial entomological interest in these groups also.

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Note added in proof. The double hedgerow referred to was grubbed up and the whole of the factory grounds ploughed in the spring of 1962, pending re-allocation of the allotments. The poplars remain, but all other plants have been destroyed. Only insects which can burrow out of the soil and which do not continue to feed in spring are likely to survive.

Entomology with a Lens

By B. L. J. BYERLEY

(Extract from *Presidential Address, December 1961*)

Optical instruments of some kind are used in all branches of natural history: ornithologists have their binoculars and telescopes, whilst botanists, entomologists and geologists use hand lenses in the field and microscopes in the laboratory. All at some time use cameras as a method of recording.

It is the camera that interests us to-night. A lens is the first requirement for a camera, and glass, the raw material from which a lens can be made.

The earliest glass has been dated as 7,000 B.C. This was found in Egypt but is believed to have originated in Asia Minor, probably Mesopotamia. The first reference to the use of lenses was found in the archives of the old Abbey of Saint-Bavon-les-Gand stating that Nicola Bullet, a priest, used spectacles when signing an agreement in 1282. In 1591 the first treatise on lens making was written by John Baptista Porta of Naples which he entitled "Natural Magick".

The 17th century saw the development of telescopes and microscopes, but the first cameras did not come into being until sometime between 1816 and 1839. During this period several people were trying to produce a permanent reproduction through a lens. The most outstanding of these experimenters was Daguerre who in 1826 made the first really permanent photographs; these have become known as Daguerrotypes. Some of Daguerre's pictures are still in existence and remain in good condition even to-day.

In 1888 George Eastman put the roll film camera on the market. "You push the button, we do the rest" was his slogan. This invention made photography possible for everybody. Until 1891 only black and white pictures had been made but in this year Lippman produced the first colour picture, though it was not until 1907 that a commercial colour process was introduced and this was on glass plates. The year 1927 saw the first colour film on the market, and the type of film we use to-day was launched in 1936.

With the development of the low-priced miniature camera in the post-war years, colour photography is within everybody's reach.

The accompanying pictures are some of my efforts, using this medium as a tool in entomology.

Deilephila elpenor Linn. (Facing page 16).

The Elephant Hawk-moth has been found frequently in London since the war years. An abundance of its food plant (Rosebay Willowherb) growing on the bombed sites has been the main factor responsible for its occurrence. The insect has a wing expanse of 66 mm.

Tettigonia viridissima Linn. (Facing page 33).

The largest of our Orthoptera, commonly known as the Great Green Grasshopper, appears to be confined (in the London area) to the Thames marshes. The illustration shows a female which measures 95 mm. from the tip of the ovipositor to the tip of the antennae.

Volucella zonaria (Poda). (Facing page 68).

This is the largest of our Syrphid flies, with a wing expanse of 38 mm. At one time this fly was only a migrant, but it became established on the south coast some years ago, and has gradually spread northwards. In 1950 there were numerous records of its being found in London, since when it has been recorded each summer even from the north of our area. It breeds in the debris at the bottom of wasps' and hornets' nests.

Aeshna cyanea (Mueller). (Facing page 85).

The Southern Aeshna dragonfly can often be seen hawking along London streets. Maybe the reason for its presence in town is that it will breed in any stagnant water that has a supply of food such as Chironomid larvae. Across the wings this insect measures 100 mm., its body being 70 mm. long.

The Survey of Bookham Common

TWENTIETH YEAR

Progress Report

THE Conservation Corps paid further visits to the Common and continued the work of scrub clearance in Central Plain; an account is given below by the leader, Bruce Ing. Further observations have been made on the vegetation of the cleared area and of some of the woodland areas. C. P. Castell was invited to serve on the National Trust Bookham Commons Committee and, with Dr. A. M. Easton, an old member of the Society as Chairman, wild life conservation and the work of the Survey team should receive sympathetic encouragement from the Committee.

BIRDS; (G. Beven)

During the spring of 1961, another census was taken of the territories of singing males of certain birds in the sample of dense oakwood (Eastern Wood). The team were thus able to assist the new enquiry organized by the British Trust for Ornithology, a "Breeding Season Census of Common Birds". The figures for 1961 for the numbers of territories in the 40 acres of oakwood are: Robin 27, Wren 17, Blue Tit 18, Great Tit 12, Blackbird 9, Chaffinch 4-5, Willow Warbler 2, Chiffchaff 1. Comparison with figures for previous years shows that the Chaffinch population remains at a low level, although there may be a very slight increase. The Blue and the Great Tit numbers have kept up to the previous maximum. The Willow Warbler population in Eastern Wood has declined very considerably since the peak of 21 territories in 1950; except for a temporary increase in 1956 and 1957, the downward trend of the numbers has been steady and rapid since 1950.

It is interesting to compare these results with the fluctuations in the population of the same species in oakwood in the Severn Valley (Philips Price, M., 1960, *British Birds*, **54**, 100-106). There the Willow Warblers reached a peak in numbers in 1939 and have decreased in most years since, but more gradually than at Bookham. Philips Price suggests that the decline may be partly due to a decrease in rabbits allowing the bramble to spread over the floor of the wood, thus restricting suitable nesting sites for the Warblers. In Eastern Wood at Bookham, however, other factors must operate, as there is little evidence that the rabbit exerted any marked effect on the bramble, which has not increased much. In addition, the number of Willow Warblers had already been reduced to half the 1950 total by 1954, when myxomatosis reduced the rabbit population.

Miss E. M. Hillman took a census in a more open oakwood, with some gorse-covered and grassy patches, at Chislehurst Common, Kent and found a similar decrease of Willow Warblers between 1952 and 1955. On the other hand, outside woodland the situation appears to be different. Counts made at Bookham between 1948 and 1959, on grassland with encroaching scrub, do not suggest that there has been any significant decrease in the breeding population of this species. (Melluish, W. D., 1960, *L.N.*, **39**, 93).

Work is proceeding on the feeding niches of birds on the plains of grassland with scrub. There is still not sufficient data for detailed analysis, but the use made by birds of the various niches is becoming clearer.

There were practically no hawthorn berries on the plains in the autumn of 1961, presumably the result of a frost in late May. Consequently very few Redwings or Fieldfares were present in the last quarter of the year when they are usually numerous. There was only one record of a Grasshopper Warbler on the Common this year and that was in April, when it might have been a bird of passage. This is the first year since 1948 in which birds of this species have not been found during the breeding season. A Common Redstart was seen on 9 April, 1961, and another on 13 August, 1961. This species is rarely recorded from the common but was noted in 1942 and in April 1944.

The Jack Snipe, *Lymnocryptes minimus*, is not mentioned in the checklist of birds for the Common (Carrington, L. I., Castell, C. P., and Wilton, A. R., 1944, *L.N.* for 1943, 23-29). This species has, however, been observed occasionally since then in the winter frequenting the more waterlogged parts of the plains, chiefly near Bookham Stream and by ditches. The records are:—10 March, 1946, one (P. W. E. Currie and A. R. Wilton); 12 February, 1956, one (W. D. Melliush); 13 January, 1957, one (W.D.M. and Miss E. M. Hillman); 13 March, 1960, one (G. Beven); 12 February, 1961, one; 12 March, 1961, four; 9 April, 1961, one; 14 January, 1962, three (W.D.M.). A Green Sandpiper, *Tringa ochropus*, seen flying low over Central Plain on 13 August, 1961 (G.B.), appears to be the first recorded for the Common. The Kingfisher, *Alcedo atthis*, is another species not mentioned in the above checklist. It has been seen occasionally on the Common, e.g. in January 1947, February 1949, August and November 1961.

MAMMALS; (G. Beven)

Rabbits had become numerous again in 1957 after being considerably reduced by myxomatosis in 1954. They seem to be still increasing and, during recent months, have been seen quite frequently on Central and Bayfield Plains and fresh "droppings" are plentiful there. Small patches of close-cropped grass are now appearing, especially on Central Plain.

Grey Squirrels were considered to be more numerous than usual in the spring of 1961 at Bookham, and according to some reports were unusually abundant elsewhere in the south of England. In Eastern Wood (40 acres) at the end of May, at least 37 birch trees and one hazel were found to have the bark stripped off the trunk all round the tree and for a distance of 8-15 feet up the tree, usually near the top. The teeth marks of the squirrels could be clearly seen. They had stripped off the silver bark and the fresh green bark underneath. Shorten ("Squirrels", Collins, 1954) believes that the squirrels do this to lick, or chew, the cambium layer in order to obtain the sweet sap, which is ascending in May. We have no previous records of such extensive bark-stripping by squirrels since the Survey began in 1941. The very dry weather in the late spring of 1961 may have aggravated the habit. On a subsequent visit to the wood in February, 1962, it was found that some of the smaller trees had broken across the trunk, possibly due to the weight of snow after a heavy fall on 31 December, 1961. Some bark had been stripped by squirrels on six of these broken trees and, in each case, the trunk had snapped across through a stripped area.

Hairs collected from a sett in South-east Wood on 15 January, 1961, by J. B. Hall have been identified as those of a badger. This is believed

to be the first definite record of a badger on the common. Previously on 14 October, 1956, a skull of this species had been found on top of a small stick standing upright in the ground in Hill House Wood, ref. 513 (G.B.). This earlier record has not been published until now as the skull might possibly have been brought to the site.

The Conservation Corps at Bookham

By BRUCE ING

BOOKHAM COMMON has been one of the favourite venues of the Conservation Corps almost since its formation in 1959, and a member of the Corps does not feel completely "initiated" until he or she has visited Bookham.

In November, 1959, a site meeting was held, attended by interested parties from the National Trust, the Nature Conservancy, the London Natural History Society and the Conservation Corps. As the Society has kept very careful records for a number of years, it was decided to clear part of Central Plain as an experiment in restoration of open conditions. It was proposed to clear some five acres of mixed scrub by hand and small mechanical plant.

Work started in December, 1959, and has continued during early spring, autumn and winter on a total of ten week-end visits up to December, 1961.

The scrub consists mainly of hawthorn and blackthorn with some birch and a little sallow. The biggest problem is the tangle produced by the briars growing through clumps of thorn. Growing among the scrub are many small oaks, an odd apple and some willows. A few Turkey oaks grow in the middle of the Plain. During clearance every effort is made to protect the oaks and these are rarely removed. The general method of clearing has been to pull out the smaller bushes using a monkey-winch or ropes, and to cut down to ground level anything difficult to pull out. Disturbance of the soil around the roots has been kept to a minimum.

As a result of the activities of the Corps great piles of brushwood have become a feature of the plain and from time to time these are burnt under close supervision. Bonfires are always appreciated by the volunteers and the possibility of "burning" miraculously enlarges the party. The results are favourable, although the initial assessment of progress was rather generous. Scrub looks easy to clear until clearance actually commences and the difficulties appear.

A belt of thorn was left by the station footbridge to form a barrier and a roost; tongues of scrub and isolated clumps of large thorns will now be left to provide enough diversity of habitat. The original target of five acres has now been achieved and other methods and problems are being considered.

In March 1961, the Nature Conservancy instituted an experiment in the use of certain chemicals to prevent regeneration of cut hawthorn, and the Corps cut a plot of one square chain. The area was very poor in ground or herb layer vegetation, being very dense thorn scrub. A preliminary report on the experiment shows that a very good "kill" can be expected

from this method as little regeneration occurred in the months after the application. The poison is painted on to the stumps and there is no chance of other vegetation being affected. In August, 1961, 24 species were flowering in the plot and many more were in a vegetative state. This is a large increase and includes many plants of open grassland. Later visits have also shown a big increase in the bryophyte population. If further reports are satisfactory this method of poisoning the stumps, using 2-4-5-T, may be adopted for scrub clearance in general. There is ample evidence that rabbits assist in keeping new growth down; until they reappeared all new growth had to be cut by hand.

The control of the resultant grassland will present some problems, but mowing at certain periods of the year should eventually discourage the coarse tussock grasses.

Accidents during work are fortunately rare and minor. The greatest evil is the thorn and, although leather gloves are available, a good deal of the organizers' time is spent in removing thorns from various parts of volunteer anatomy.

An important aspect of the work of the Conservation Corps is the opportunity for natural history education. Many of the volunteers receive their introduction to the countryside and wild nature at Bookham, and the diversity of habitats present makes this of particular value. To those who already have an interest, as much encouragement as possible is given for them to pursue this whilst out with the Corps, bearing in mind that working time is severely limited in the winter months.

Of the many attractions at Bookham, perhaps the bird life is that which has most appeal to volunteers. In spring, they often hear the first Chiffchaffs, and woodpeckers are frequently seen and heard. Friendly Robins take a close interest in the work and this is much appreciated by our younger members. The opportunity to demonstrate the general principles of ecology is not lost and the various plant communities are investigated at different times of the year. The pits and ponds provide an introduction to freshwater biology and our visits in the autumn coincide with the fruiting season of many common fungi. The occasional Fly Agaric is admired and compared with its lethal relative, the Death Cap. Boleti and *Clavaria fusiformis* are objects of unusual beauty and the many Bracket fungi are pointed out and their damaging properties discussed. We cannot work during summer months because of disturbance to bird and plant life and so an incomplete picture of the Common must be given to the volunteers.

The youngsters working at Bookham come from many walks of life and a typical party will contain university students, youth club members, sixth-formers, professional men and women, police cadets, scouts, guides and many more categories. The fact that they all mix so readily and work together well is an interesting point of human ecology. The local scout troop helps whenever possible and also plans to collect litter. Since the Corps began the work, nearly 350 volunteers have taken part, a third of these coming from youth clubs and similar organizations.

Local reaction to our work has been favourable in most cases and many people have stopped to enquire what we are doing. In this way the urgent need for management can be explained and suitable publicity given to the Bookham project and conservation in general. Adverse comments have been fortunately few, one of the most amusing coming

from a porter at Bookham station who complained that we were taking away the cover for courting couples.

Work in the future will entail further scrub clearance and later the control of the re-created grassland. The ponds and pits will also claim attention. The Isle of Wight pond is rapidly becoming overgrown by Reedmace and we shall be required to control this and also to "prune" the sallow, although the entomologists would be loth to see them much reduced. It has also been suggested that we restore an overgrown gun-pit to its original condition so that a study may be carried out on the subsequent re-colonization, which will make a valuable comparison with the previous study.

The keynote of this work is therefore carefully controlled clearance followed by detailed study of change. In this way, the variety of habitats can be maintained and increased and the amenity of the common protected. To do this work we must have more support, both from those willing to help the actual clearance work and others to record and measure the results.

The Vegetation of Devilsden Wood and nearby Downs, Coulsdon, Surrey

By A. W. JONES

INTRODUCTION

THE Survey Area is situated to the south-east of Farthing Downs, Coulsdon, Surrey (grid ref. TQ(51)/305570). It covers about a quarter of a square mile (137 acres) and consists of a valley, about 100 feet in depth throughout, running N.N.W. to S.S.E. just under one mile long and on average about a quarter of a mile wide. The area has been divided into 9 divisions, lettered A-I, roughly of equal size and with fairly clear topographical features forming their boundaries (see accompanying map). The valley floor is bisected by Central Path. To the east of Central Path the valley is of chalk. To the west of Central Path are found:

1. Chalk in A, F and the extreme north of G.
2. Clay in H, I and the rest of G.
3. Clay downwash overlying the chalk in D and E.

The following habitats are discussed below:—

	<i>Lists</i>	<i>No. of Species</i>
1. Devilsden Wood on chalk and clay ..	1-5	145
2. Shaws on the chalk	6-8	109
3. Hedges, etc.	9-10	75
4. Chalk grassland with its development of scrub	11-15	144
5. Grassland on the clay downwash ..	16	71
6. Hayfields on clay	17	52
7. Waste Places	18	74
8. Pond	19	7

The notes for this paper were collected in thirteen visits during 1957 and 1958. Most of these were field meetings of the Ecological Section as part of a regular survey and thanks are due to various members who assisted. During the visits the plants and their frequencies were listed for each of the habitats in each division. From these notes it was possible to gauge the overall frequency of each plant in each of the habitats in which it occurred. On the whole only rare plants were completely confined to a single habitat and many of the common ones were tolerant of a wide variety of conditions. A total of 279 species were recorded in the survey area and, as will be seen from the table above, plants on average were each recorded from two habitats.

In the lists which follow, the English names and the divisions in which a plant has been noted are given in brackets under its chief habitat in the survey area. Any other notes in brackets refer only to the habitat under discussion.

Dandy (1958) has been followed for scientific names and unless otherwise indicated the order of that work has been followed within the categories in the lists. Johns (1905) has been followed in the main for English names.



DEVILSDEN WOOD AND NEARBY DOWNS

DEVILSDEN WOOD

Devilsden Wood is on a slope of the valley facing north-north-east. Division F and the northern tip of G are on the chalk but the rest of the Wood is on clay. Considering the difference in soils the general flora is remarkably similar. *Quercus robur* is the dominant tree on the clay, *Taxus baccata*, *Fagus sylvatica* and *Ulmus procera* on the chalk. The other trees and shrubs are on the whole generally distributed over the wood, but the clay may not be thick in many places and possibly roots of some trees and shrubs reach down to the underlying chalk. There is probably often a thin clay downwash on the chalk area and possibly superficial deposits of either stratum in various parts. The soil on the clay is not very acid although *Oxalis acetosella* occurs here and there. *Endymion nonscriptus*, very abundant on the clay, appears to be absent from the chalk area. Of the commoner species *Anemone nemorosa*, *Oxalis acetosella* and *Conopodium majus* appear to be more frequent on the clay than on the chalk, where *Mercurialis perennis* is more abundant. Of the rarer species it is difficult to tell whether they occur only on clay or chalk by chance, but the few Orchids typically belong to the chalk. The shrubs normally typical of the chalk scrub are also more frequent in the chalk area F except *Crataegus monogyna* which seems generally distributed.

The trees and shrubs (List 1–35 species) are fairly dense but there is a rich flora under them in spring. Apart from the four trees already mentioned *Fraxinus excelsior* and *Prunus avium* are frequent and under the general canopy a layer of *Corylus avellana* and *Crataegus monogyna* and beneath these *Rubus fruticosus* s.l.

List 2 (55 species) gives the herbs normally occurring well into the wood and not merely confined to the open parts. *Endymion nonscriptus* (clay only), *Silene dioica*, *Mercurialis perennis*, *Galeobdolon luteum*, *Galium odoratum*, *Deschampsia cespitosa*, and *Milium effusum* make up the basic flora.

Along rides and in open parts 23 species given in list 3 are found, chief of which is *Festuca gigantea*.

Where woods have been recently cleared a number of casuals occur in addition to the normal woodland species. List 4 gives 18 plants most of which could be classed as weeds. Many have wind-blown seeds which enable them to colonize the cleared area for a short while until pushed out by perennial woodland species.

Old clearings may become grassed over and here and alongside open paths a grassland flora develops of which 14 species are given in list 5.

The purple-flowered form of *Viola odorata* has been recorded from Division A and a white form in D and F. In F in Devilsden Wood it is in the company of the usual purple form of *V. reichenbachiana* and also with what appears to be a white form of *V. reichenbachiana* but which may be a hybrid.

LIST 1

DEVILSDEN WOOD—TREES AND SHRUBS

TREES

Dominant on Clay: *Quercus robur* (Common Oak A-I).

Co-dominant on Chalk: *Taxus baccata* (Yew ABE-G), *Fagus sylvatica* (Beech D-H), *Ulmus procera* (Common Elm CDF).

Frequent: *Prunus avium* (Gean C-I), *Fraxinus excelsior* (Ash AC-I).

Occasional: *Acer campestre* (Hedge-Maple A-FHI).

Rare: *Larix decidua* (Larch FG), *Pinus* sp. (Pine F), *Acer pseudoplatanus* (Sycamore FG), *Aesculus hippocastanum* (Horse-chestnut FG), *Sorbus aria* s.l. *Malus sylvestris* (Crab Apple CG-I), *Crataegus oxyacanthoides* (Midland Hawthorn H), *Betula alba* s.l., *Quercus petraea* (Durmast Oak F, needs confirming), *Populus tremula* (Aspen HI).

UPPER SHRUB LAYER

Dominant: *Corylus avellana* (Hazel A-I).Abundant: *Crataegus monogyna*.Frequent: *Sambucus nigra* (Common Elder A-I).Occasional: *Ilex aquifolium* (Holly A-I).Local: *Clematis vitalba*.Rare: *Prunus spinosa*, *Sorbus aucuparia* (Mountain Ash I).

MIDDLE SHRUB LAYER

Dominant: *Rubus fruticosus* s.l. (Blackberry A-I).Occasional: *Lonicera periclymenum* (Honeysuckle AE-I).Local: *Thelycrania sanguinea*.Rare: *Euonymus europaeus*, *Rhamnus catharticus*, *Ribes rubrum* s.l. (Red Currant F), *Salix caprea*, *Ligustrum vulgare*, *Viburnum lantana*, *V. opulus*.

GROUND SHRUB LAYER

Frequent: *Hedera helix* (Ivy A-I).

LIST 2

DEVILSDEN WOOD—HERBS OF THE TRUE WOODLAND

Very abundant on the clay: *Endymion nonscriptus* (Bluebell C-E G-I).Abundant: *Silene dioica* (Red Campion A-D F-I), *Mercurialis perennis* (Dog's Mercury A-I), *Galeobdolon luteum* (Yellow Archangel B-I), *Galium odoratum* (Woodruff BCF-H), *Deschampsia cespitosa* (Tufted Hair-grass A-I), *Milium effusum* (Wood Millet Grass CE-I).Very frequent: *Bromus ramosus* (Rough Brome A-I), *Brachypodium sylvaticum* (Slender False Brome A-I).Frequent: *Geum urbanum* (Common Avens B-H), *Sanicula europaea* (Wood Sanicle A-H), *Galium aparine*, *Poa trivialis*, *Melica uniflora* (Wood Melic C-I).Locally frequent: *Arum maculatum*.Occasional: *Anemone nemorosa* (Wood Anemone DG-I), *Ranunculus ficaria* (Lesser Celandine B-I), *Viola reichenbachiana*, *Oxalis acetosella* (Wood-Sorrel CG-I), *Adoxa moschatellina* (Moschatel BCF-I), *Tamus communis* (Black Bryony A-FHI), *Carex sylvatica* (Wood Sedge BF-H).Local: *Pteridium aquilinum* (Bracken C-E G-I), *Dryopteris filix-mas* s.l. (Male Fern BF-I), *Ranunculus auricomus* (Goldilocks BDF-H), *Geranium robertianum*, *Conopodium majus* (Pig-nut G-I), *Rumex sanguineus*.Rare: *Phyllitis scolopendrium* (Hart's-tongue Fern F), *Dryopteris dilatata* (Broad Buckler-fern G-I), *Viola odorata*, *Moehringia trinervia* (Three-veined Sandwort ACE-I), *Fragaria vesca* (Wood Strawberry AD-H), *Epilobium montanum*, *Circaea lutetiana* (Enchanter's Nightshade CGH), *Angelica sylvestris* (Wild Angelica BFH), *Euphorbia amygdaloides* (Wood Spurge CDFI), *Primula veris*, *P. vulgaris* (Primrose F), *Lysimachia nemorum* (Yellow Pimpernel F), *Solanum dulcamara*, *Veronica montana*, *V. chamaedrys*, *V. hederifolia*, *Ajuga reptans* (Common Bugle B-H), *Campanula trachelium*, *Arctium* sp., *Mycelis muralis* (Ivy-leaved Lettuce F), *Luzula pilosa* (Broad-leaved Hairy Wood-rush H), *Cephalanthera damasonium* (White Helleborine F), *Epipactis helleborine* (Broad-leaved Helleborine F), *Listera ovata*, *Neottia nidus-avis* (Bird's-nest Orchid F), *Dactylorchis fuchsii* (Common Spotted Orchid ABDF), *Holcus mollis* (Creeping Soft-grass HI).

LIST 3

DEVILSDEN WOOD—HERBS OF THE OPEN PARTS OF THE WOODLAND

Abundant: *Festuca gigantea* (Giant Brome A-I).Locally abundant: *Stachys sylvatica*.Frequent: *Heracleum sphondylium* (Hog-weed A-I).Locally frequent: *Glechoma hederacea*, *Anthoxanthum odoratum*.Occasional: *Stellaria holostea* (Greater Stitchwort B-I), *Vicia sepium* (Bush Vetch B-D F-I), *Chamaenerion angustifolium* (Rosebay ACDHI), *Anthriscus sylvestris*, *Urtica dioica*, *Plantago major* (Greater Plantain ACDFGI).Local: *Pimpinella major* (Greater Burnet Saxifrage BF-H), *Poa nemoralis* (Wood Meadow-grass ADFHI), *Agropyron caninum*.Rare: *Cardamine pratensis* (Lady's Smock GH), *Alliaria petiolata*, *Hypericum hirsutum*, *Lathyrus montanus* (Tuberous Bitter Vetch H), *Potentilla sterilis* (Barren Strawberry ACE-I), *Bryonis dioica*, *Prunella vulgaris* (Self-heal AC-FHI), *Cirsium palustre* (Marsh Plume-Thistle H), *Holcus lanatus*.

LIST 4

DEVILSDEN WOOD—CASUALS IN RECENTLY CLEARED AREAS

Chenopodium album (White Goosefoot H), *Atriplex patula* (Spreading Orache HI), *Vicia hirsuta* (Hairy Tare H), *Epilobium* cf. *obscurum* (Dull-leaved Willow-herb H), *Galeopsis tetrahit* s.l. (Common Hemp-nettle HI), *Senecio jacobaea*, *S. vulgaris*, *Tussilago farfara*, *Tripleurospermum maritimum* (Scentless Mayweed H), *Carduus acanthoides*, *Cirsium vulgare*, *Lapsana communis*, *Hypochoeris radicata*, *Sonchus oleraceus* (Common Sowthistle FH), *S. asper* (Rough Sowthistle EHI), *Crepis vesicaria* (Beaked Hawk's-beard EI), *Triticum* sp., *Agrostis gigantea*.

LIST 5

DEVILSDEN WOOD—HERBS OF GRASSY AREAS IN THE WOODLAND

Ranunculus acris R. *repens*, *R. bulbosus*, *Cerastium holosteoides*, *Stellaria media* (Chickweed FHI), *Trifolium pratense*, *Bellis perennis*, *Cirsium arvense*, *Taraxacum* sp., *Festuca pratensis*, *Lolium perenne*, *Poa annua* (Annual Meadow Grass ACDFHI), *Dactylis glomerata*, *Phleum bertolonii*,

THE SHAWS

Along the north-east boundaries of BCD and E on chalk, which is probably often thinly capped with clay, belts of woodland or shaws occur. It is not certain how these shaws originated. They may be remnants of larger woods left as windbreaks (or specially planted) or they could be ancient hedges, long neglected, the constituents of which have grown into trees and around which scrub and trees have been allowed to develop.

The trees, principally *Quercus robur* and *Sorbus aria* s.l., are not very tall and are absent in places. The upper shrub layer chiefly composed of *Crataegus monogyna* and *Corylus avellana* is often prominent. Underneath *Rubus fruticosus* s.l. is dominant and beneath this *Hedera helix*. List 6 gives the 25 trees and shrubs.

The shaws are often very open compared with Devilsden Wood and there is a tendency for plants preferring more light to be more frequent in the shaws and the deep woodland species to be less frequent. Amongst the common species *Endymion non-scriptus* (but see remarks under Devilsden Wood), *Galeobdolon luteum* and *Milium effusum* are very much less frequent in the shaws but *Prunus spinosa*, *Anthriscus sylvestris*, *Holcus lanatus*, *Sorbus aria* s.l. and *Urtica dioica* much more so.

Eighty herbs are given in list 7, 16 rare ones of which are really plants of grassland, etc., rather than even open woodland. The abundant herbs are *Silene dioica*, *Anthriscus sylvestris*, *Mercurialis perennis*, *Galeobdolon luteum*, *Galium aparine*, *Festuca gigantea*, *Poa trivialis* and *Brachypodium sylvaticum*.

On the border of D and E an old and very small chalk quarry has become overgrown with scrub and trees and joined up with the shaw. Its flora is largely a mixture of that of the shaws and the chalk scrub but list 8 gives four species very rare in the survey area.

LIST 6

SHAWS—TREES AND SHRUBS

TREES

Locally dominant: *Quercus robur*.

Locally abundant: *Sorbus aria* s.l. (White Beam AC-G).

Locally frequent: *Ulmus procera*, *Fagus sylvatica*, *Fraxinus excelsior*.

Occasional: *Prunus avium*.

Rare: *Taxus baccata*.

UPPER SHRUB LAYER

Abundant: *Crataegus monogyna*, *Corylus avellana*.

Frequent: *Prunus spinosa* (Blackthorn A-EHI), *Sambucus nigra*.

Occasional: *Clematis vitalba* (Traveller's Joy A-FI), *Acer campestre*.

Local: *Ilex aquifolium*, *Rhamnus catharticus*.

Rare: *Euonymus europaeus*, *Thelycrania sanguinea*, *Viburnum lantana*, *V. opulus* (Guelder Rose EF), *Lonicera periclymenum*.

MIDDLE SHRUB LAYER

Dominant: *Rubus fruticosus* s.l.

Rare or Local: *Rosa arvensis*, *Ribes uva-crispa* (Gooseberry D), *Ligustrum vulgare*.

GROUND SHRUB LAYER

Abundant: *Hedera helix*.

LIST 7

SHAWS—HERBS

Abundant: *Silene dioica*, *Anthriscus sylvestris* (Wild Chervil A-I), *Mercurialis perennis*, *Galeobdolon luteum*, *Galium aparine* (Cleavers A-I), *Festuca gigantea*, *Poa trivialis* (Rough Meadow-grass AC-I), *Brachypodium sylvaticum*.

Frequent: *Viola reichenbachiana* (Pale Wood Violet B-D F-H) the aggregate *V. sylvatica* s.l. (also in A and E), *Geum urbanum*, *Heracleum sphondylium*, *Urtica dioica*, *Stachys sylvatica* (Hedge Woundwort A-I), *Glechoma hederacea* (Ground Ivy A-I), *Arum maculatum* (Cuckoo-pint A-I), *Melica uniflora*, *Bromus ramosus*, *Holcus lanatus*, *Deschampsia cespitosa*.

Locally frequent: *Dactylis glomerata*, *Agropyron caninum* (Bearded Couch C-F).

Occasional: *Ranunculus ficaria*, *Geranium robertianum* (Herb Robert A-FHI), *Sanicula europaea*, *Rumex sanguineus* (Bloody-veined Dock A-I), *Veronica chamaedrys*, *Plantago major*, *Campanula trachelium* (Nettle-leaved Bellflower C-G), *Lapsana communis* (Nipplewort A-H), *Endymion non-scriptus*.

Local: *Viola odorata* (Sweet Violet ABDF), *Stellaria holostea*, *Vicia sepium*, *Epilobium montanum* (Broad Small-leaved Willow-herb CEGH), *Chaerophyllum temulentum* (Rough Chervil E), *Galium odoratum*, *Tamus communis*, *Arrhenatherum elatius*.

Rare: *Pteridium aquilinum*, *Dryopteris filix-mas* s.l., *Anemone nemorosa*, *Ranunculus auricomus*, *Alliaria petiolata* (Garlic Mustard CEH), *Hypericum hirsutum*, *Moehringia trinervia*, *Oxalis acetosella*, *Potentilla sterilis*, *Fragaria vesca*, *Chamaenerion angustifolium*, *Circaea lutetiana*, *Torilis japonica* (Upright Hedge-Parsley A-EH), *Bryonia dioica*, *Euphorbia amygdaloides*, *Solanum dulcamara*, *Veronica montana* (Mountain Speedwell CDF-H), *V. hederifolia* (Ivy-leaved Speedwell CFH), *Prunella vulgaris*, *Lamium album*, *Ajuga reptans*, *Adoxa moschatellina*, *Arctium* sp., *Carex sylvatica*, *Poa nemoralis*, *Milium effusum*.

Rare and not typical: *Ranunculus repens*, *Hypericum perforatum*, *Medicago lupulina*, *Trifolium pratense*, *T. repens*, *Conium maculatum*, *Convolvulus arvensis*, *Dipsacus fullonum* (Wild Teazle C), *Senecio jacobaea*, *Bellis perennis*, *Achillea millefolium*, *Carduus acanthoides*, *Centaurea nigra* s.l., *Taraxacum* sp., *Poa annua*, *Agrostis stolonifera*.

LIST 8

SELECTED SPECIES IN QUARRY

Rare: *Chaerophyllum temulentum*, *Calystegia sepium* (Great Bindweed E), *Scrophularia nodosa* (Knotted Figwort E), *Viburnum opulus*.

HEDGES, ETC.

True hedges—those dividing fields from each other or bordering roads—only occur in E and I but edges of wood or dense scrub, bordering fields or roads, often develop a separable hedgerow-type scrub and a very similar herb flora, and list 9 (23 trees and shrubs) and list 10 (52 herbs) cover all these habitats. Particular care has been taken to exclude species of adjoining fields and those not normally occurring just outside woodland.

LIST 9

HEDGES, ETC.—TREES AND SHRUBS

Locally dominant: *Rosa arvensis* (Trailing Rose DEHI), *Prunus spinosa*.

Locally frequent: *Thelycrania sanguinea*, *Corylus avellana*, *Fraxinus excelsior*, *Ligustrum vulgare*.

Occasional: *Clematis vitalba*, *Acer campestre*, *Ilex aquifolium*, *Rubus fruticosus* s.l., *Crataegus monogyna*, *Hedera helix*, *Sambucus nigra*.

Local: *Taxus baccata*, *Rhamnus catharticus*, *Viburnum lantana*.

Rare: *Rosa canina* s.l., *Prunus avium*, *Sorbus aria* s.l., *Malus sylvestris*, *Betula alba* s.l. (Birch AFI), *Quercus robur*, *Salix caprea* (Great Sallow AHI).

LIST 10

HEDGES, ETC.—HERBS

Frequent: *Anthriscus sylvestris*, *Heracleum sphondylium*, *Stachys sylvatica*.

Locally frequent: *Mercurialis perennis*, *Tamus communis*, *Brachypodium sylvaticum*.

Occasional: *Chamaenerion angustifolium*, *Pimpinella major*, *Bryonia dioica* (White Bryony A-CEG-I), *Rumex sanguineus*, *Urtica dioica*, *Glechoma hederacea*, *Galium aparine*, *Arum maculatum*.

Local: *Pteridium aquilinum*, *Viola odorata*, *V. reichenbachiana*, *Hypericum hirsutum*, *Fragaria vesca*, *Galium mollugo*, *Bromus ramosus*, *Agropyron caninum*.

Rare: *Silene vulgaris*, *S. dioica*, *Moehringia trinervia*, *Vicia sepium*, *Lathyrus pratensis*, *Potentilla sterilis*, *Geum urbanum*, *Epilobium montanum*, *Sanicula europaea*, *Torilis japonica*, *Myosotis arvensis* (Field Scorpion-grass ABE), *Convolvulus arvensis*, *Calystegia silvatica* (Bladder Bindweed FH), *Solanum dulcamara* (Bittersweet CEHI), *Veronica hederifolia*, *Galeopsis tetrahit* s.l., *Inula conyza* (Ploughman's Spikenard A), *Artemisia vulgaris*, *Arctium* sp., *Carduus acanthoides*, *Cirsium arvense*, *Centaurea nigra* s.l., *Lapsana communis*, *Poa trivialis*, *Bromus sterilis*, *Agropyron repens*, *Holcus lanatus*, *H. mollis*, *Deschampsia cespitosa*, *Agrostis gigantea*.

CHALK GRASSLAND

The chalk grassland occurs in divisions A-E. The dominant herb throughout is *Bromus erectus* but this grass allows many others to be frequent. As will be seen from list 11, 81 species are found (ignoring scrub and disturbed places) of which 28 can be said to be frequent.

The 29 species given in list 12 are associated with the chalk grassland where there is an element of disturbance e.g. by paths and tracks. It is probable that the whole area was in cultivation in the 1914/18 war and the chalk grassland has not yet fully settled down to a "natural" flora as the presence of *Dactylis glomerata* and *Festuca pratensis*, on list 11, may suggest.

Scrub is well developed in A B and C chiefly at the bottom of the slopes and along Drive Road, and it becomes in places almost woodland. In D and E (except in E along the site of an old track to the small quarry) there is little scrub but it is understood that these areas were cleared by the local authority some years ago. *Crataegus monogyna* is the dominant shrub with *Thelycrania sanguinea* abundant and *Rhamnus catharticus*, *Rosa canina* s.l. and *Viburnum lantana* frequent. The 20 shrubs occurring are given in list 13.

Herbs specially associated with the open scrub are few, the most noteworthy being *Hypericum hirsutum*. Where the scrub becomes dense a few woodland species begin to appear. The 14 species associated with the scrub are given in list 14.

Ant-hills are scattered in chalk grassland and a few of these which had not been swamped by *Bromus erectus* were examined; a note of the 17 species occurring is given in list 15.

LIST 11

MATURE CHALK GRASSLAND—HERBS

Dominant: *Bromus erectus* (Upright Brome A-E).

Very abundant: *Briza media* (Common Quaking-grass A-E).

Abundant: *Ranunculus bulbosus* (Bulbous Buttercup A-FI), *Lotus corniculatus* (Common Bird's foot Trefoil A-EHI), *Poterium sanguisorba* (Salad Burnet A-E), *Pimpinella saxifraga* (Common Burnet Saxifrage A-E), *Centaurea nigra* s.l. (Black Knapweed A-EHI), *Leontodon hispidus* (Rough Hawk-bit A-F).

Locally abundant: *Onobrychis viciifolia* (Sainfoin B-E), *Helictotrichon pubescens* (Downy Oat AC-E).

Very frequent: *Rhinanthus minor* (Yellow-rattle A-E).

Frequent: *Viola hirta* (Hairy Violet A-CE), *Polygala* sp. (Milkwort A-E), *Hypericum perforatum* (Common St. John's-wort A-EI), *Ononis repens* (Common Rest-harrow A-E), *Medicago lupulina* (Black Medick A-E), *Trifolium pratense* (Red Clover A-FHI), *Anthyllis vulneraria* (Kidney Vetch A-E), *Vicia cracca* (Tufted Vetch A-E), *Origanum vulgare* (Marjoram A-EI), *Thymus drucei* (Wild Thyme A-E), *Clinopodium vulgare* (Wild Basil A-EH), *Knautia arvensis* (Field Scabious A-EHI), *Scabiosa columbaria* (Small Scabious A-E), *Cirsium acaulon* (Ground Thistle A-E), *Centaurea scabiosa* (Great Knapweed A-EHI), *Carex flacca* (Glaucous Sedge A-E), *Dactylis glomerata*, *Holcus lanatus* (Yorkshire Fog A-I).

Locally frequent: *Hippocrepis comosa* (Tufted Horseshoe-vetch ACD), *Campanula glomerata* (Clustered Bell-flower B-D), *Phyteuma tenerum* (Round-headed Rampion CD), *Festuca rubra* (Creeping Fescue AC-EHI).

Occasional: *Helianthemum chamaecistus* (Common Rock-Rose A-E), *Trifolium repens*, *Lathyrus pratensis*, *Pastinaca sativa* (Common Parsnip A-E), *Daucus carota* (Wild Carrot A-CEH), *Veronica chamaedrys*, *Euphrasia officinalis* s.l. (Eye-bright A-D), *Plantago media* (Hoary Plantain AC-E), *Chrysanthemum leucanthemum* (Ox-eye Daisy A-EI), *Picris hieracioides* (Hawkweed Picris A-D), *Festuca pratensis*, *Cynosurus cristatus* (Crested Dog's-tail A-FH), *Brachypodium sylvaticum*, *Arrhenatherum elatius*, *Phleum bertolonii* (Bulbous Cat's-tail Gras, AC-F).

Local: *Agrimonia eupatoria*, *Galium verum* (Lady's Bedstraw ABDEHI), *Valeriana officinalis* (Valerian A), *Senecio crucifolius* (Hoary Ragwort A-E), *Carlina vulgaris* (Carlina Thistle ACD), *Hieracium pilosella* s.l. (Mouse-ear Hawkweed ACE), *Gymnadenia conopsea* (Fragrant Orchid AC), *Ophrys apifera* (Bee-Orchid CE), *Anacamptis pyramidalis* (Pyramidal Orchid ACD), *Poa compressa* (Flat-stalked Meadow-grass A, in short turf), *Koeleria cristata* (Crested Hair-grass A), *Trisetum flavescens* (Yellow Oat ABD-FE).

Rare: *Cerastium holosteoides*, *Trifolium campestre* (Hop Trefoil B), *T. dubium*, *Fragaria vesca*, *Rumex acetosa*, *Primula veris* (Cowslip AC-F), *Acinos arvensis* (Basil Thyme A), *Prunella vulgaris*, *Achillea millefolium*, *Leontodon autumnalis*, *L. taraxacoides* (Hairy Hawk-bit D), *Taraxacum* sp., *Luzula campestris* (Field Wood-Rush ADH), *Listera ovata* (Common Tway-blade AF), *Dactylorchis fuchsii*, *Aceras anthropophorum* (Man-Orchid A), *Festuca ovina* s.l. (Sheep's Fescue AE), *Lolium perenne*, *Poa pratensis* s.l. (Smooth Meadow-grass ACDH), *P. trivialis*, *Phleum pratense*.

LIST 12

SLIGHTLY DISTURBED CHALK GRASSLAND—HERBS

Occasional: *Ranunculus acris* (edges grassy paths), *Silene vulgaris* (Bladder Campion A-CFI), *Linum catharticum* (Cathartic Flax A-E, bare places), *Galium mollugo* (Hedge Bedstraw A-EHI), *Bellis perennis* (Daisy A-FHI, paths)

Local: *Vicia angustifolia* (Narrow-leaved Vetch A-E), *Heracleum sphondylium*, *Convolvulus arvensis*, *Verbena officinalis* (Vervain A-CE), *Plantago lanceolata* (paths), *Senecio jacobaea* (Common Ragwort ABDEHI), *Tragopogon pratensis* (Goat's-beard A-E, paths), *Sonchus arvensis* (Corn Sowthistle AI).

Rare: *Reseda lutea* (Wild Mignonette ADE), *Arenaria serpyllifolia* s.l., *Geranium dissectum*, *Potentilla anserina*, *P. reptans*, *Rumex obtusifolius*, *Urtica dioica*, *Blackstonia perfoliata* (Perfoliate Yellow-wort AC), *Gentianella amarella* s.l. (Felwort AD), *Odontites verna* (edges grassy paths), *Tussilago farfara*, *Artemisia vulgaris*, *Cirsium vulgare*, *Crepis vesicaria*, *Bromus sterilis*, *B. mollis* s.l.

LIST 13

CHALK GRASSLAND—SCRUB

Dominant: *Crataegus monogyna* (Common Hawthorn A-I).

Abundant: *Thelycrania sanguinea* (Dogwood A-FHI).

Frequent: *Rhamnus catharticus* (Common Buckthorn A-F), *Rosa canina* s.l. (Dog-Rose A-E), *Viburnum lantana* (Wayfaring-tree A-DFH).

Occasional: *Rubus fruticosus* s.l.

Local: *Ligustrum vulgare* (Common Privet ABEF).

Rare: *Taxus baccata* (seedling in dense scrub), *Clematis vitalba*, *Acer campestre*, *Euonymus europaeus* (Spindle-tree B-F), *Rosa arvensis*, *R. rubiginosa* s.l. (Sweet Briar A), *Prunus spinosa*, *P. avium*, *Sorbus aria* s.l., *Malus sylvestris*, *Betula alba*, s.l., *Corylus avellana*, *Quercus robur* (seedlings a few inches high in grassland probably dying out after a few years).

LIST 14

HERBS OF THE CHALK SCRUB

OPEN SCRUB

Frequent: *Hypericum hirsutum* (Hairy St. John's-wort A-F) spreading into open chalk grassland.

Occasional: *Tamus communis*.

Rare: *Torilis japonica*, *Bryonia dioica*, *Cirsium eriophorum* (Woolly-headed Plume-Thistle E).

DENSE SCRUB—all rare

Sanicula europaea, *Pimpinella major*, *Angelica sylvestris*, *Stachys sylvatica*, *Galium aparine*, *Adoxa moschatellina*, *Arum maculatum*, *Deschampsia cespitosa*, *Agrostis stolonifera*.

LIST 15

ANT-HILLS

Not Rare: *Thymus* sp. (including *T. drucei*), *Cerastium holosteoides*, *Veronica chamaedrys*, *Arenaria serpyllifolia* s.l. (Thyme-leaved Sandwort BE), *Pimpinella saxifraga*.

Also Recorded: *Hypericum perforatum*, *Potentilla reptans*, *Fragaria vesca*, *Betula alba* s.l. (seedling), *Origanum vulgare*, *Bellis perennis*, *Festuca rubra*, *F. ovina* s.l., *Bromus mollis* s.l., *Trisetum flavescens*, *Agrostis stolonifera*, *Phleum bertolonii*.

GRASSLAND ON CLAY DOWNWASH

Central Path runs along the floor of the valley in Divisions D and E. To the east is chalk grassland but to the west is rough grassland on what appears to be a clay downwash overlying the chalk.

Basically the chief vegetation has little in common with the chalk grassland, *Dactylis glomerata* and *Arrhenatherum elatius* being very abundant and *Rumex acetosa* and *Festuca pratensis* abundant. Of the 68 herbs given in list 16, 56 are however also recorded for chalk grassland. It is therefore the proportions which are different rather than the species present. The hayfields have 36 species in common with the grassland on the clay downwash.

It seems very likely that this grassland was sown as hayfields (possibly for other crops) during the 1939/45 war. The abundance of *Festuca pratensis* possibly indicates recent cultivation as this grass is not generally found in natural chalk grassland. *Dactylis glomerata* is dominant in D and abundant in E and was probably the main grass originally planted. The area was not mown during the survey.

The scrub is very sparse, *Crataegus monogyna* being locally frequent and the only other species recorded being *Rosa canina* s.l., and *Prunus spinosa* both in very small quantities.

LIST 16

GRASSLAND ON CLAY DOWNWASH

Very abundant: *Dactylis glomerata*, *Arrhenatherum elatius* (False Oat A-FHI).

Abundant: *Rumex acetosa*, *Festuca pratensis* (Meadow Fescue B-EI).

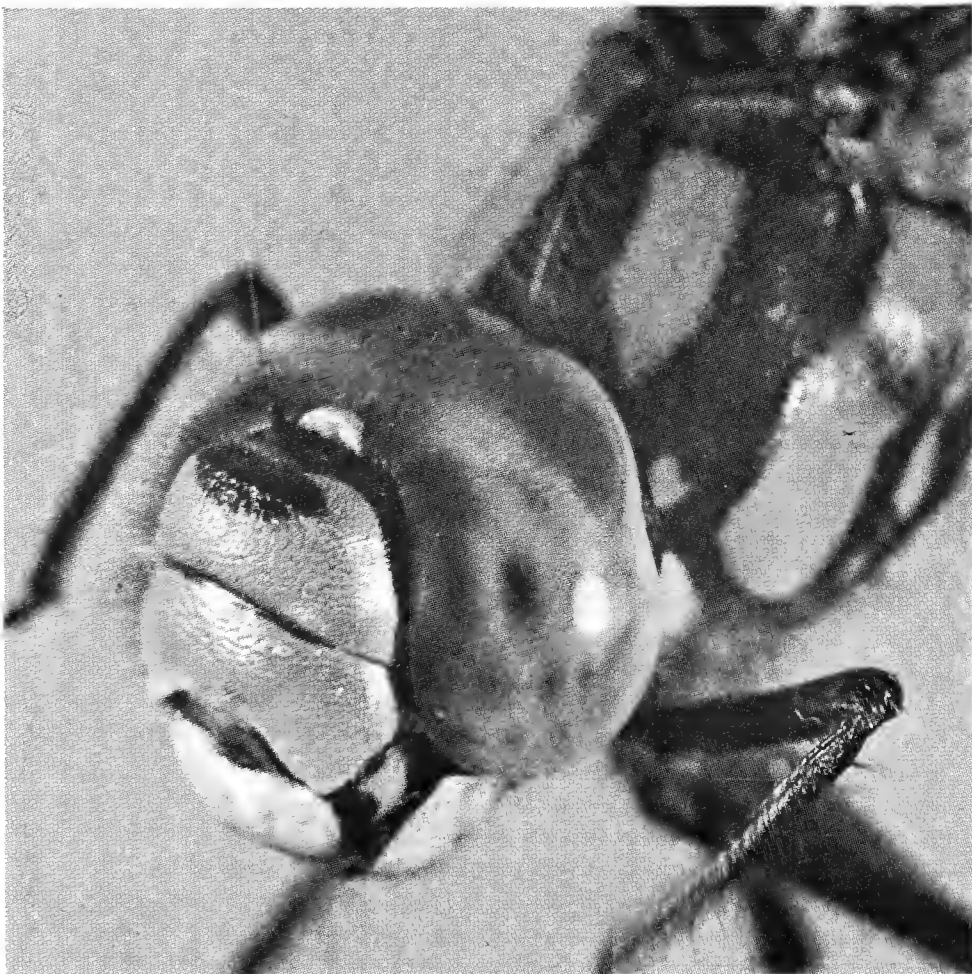
Locally abundant: *Heracleum sphondylium* (by top path).

Frequent: *Ranunculus bulbosus* (paths), *Lotus corniculatus*, *Lathyrus pratensis* (Meadow Vetchling ABDEHI), *Knautia arvensis*, *Centaurea nigra* s.l.

Locally frequent: *Agrimonia eupatoria* (Common Agrimony A-EHI), *Phleum pratense* (Timothy grass B-EHI).



Aeshna cyanea (Mueller.)



Occasional: *Trifolium repens* (White Clover A-FH), *Potentilla reptans*, *Convolvulus arvensis*, *Veronica chamaedrys*, *Cirsium arvense*, *Lolium perenne* (Common Rye-Grass AC-FHI), *Poa trivialis*.

Local: *Cerastium holosteoides* (Wayside Mouse-ear Chickweed ADEHI), *Trifolium pratense*, *Poterium sanguisorba*, *Pastinaca sativa*, *Clinopodium vulgare*, *Galium mollugo*, *G. verum*, *Holcus lanatus*, *Agrostis gigantea* (Giant Bent D-FHI), *Alopecurus pratensis*.

Rare: *Ranunculus acris*, *Hypericum perforatum*, *H. hirsutum*, *Silene vulgaris*, *Stellaria graminea* (Lesser Stitchwort DEHI), *Ononis repens*, *Medicago sativa* (Lucerne E), *M. lupulina*, *Chamaenerion angustifolium*, *Rhinanthus minor*, *Odontites verna* (Red Bartsia DEI), *Origanum vulgare*, *Prunella vulgaris*, *Betonica officinalis* (Wood Betony D), *Plantago major*, *P. media*, *P. lanceolata*, *Scabiosa columbaria*, *Senecio jacobaea*, *S. erucifolius*, *Bellis perennis*, *Achillea millefolium*, *Carduus acanthoides*, *Centaurea scabiosa*, *Hypochoeris radicata* (Long-rooted Cat's-ear DHI), *Leontodon autumnalis* (Autumn Hawk-bit AC-E), *L. hispidus*, *Tragopogon pratensis*, *Crepis capillaris* (Smooth Hawk's-beard B-DI), *Taraxacum* sp., *Festuca rubra*, *Poa pratensis* s.l., *Cynosurus cristatus*, *Briza media*, *Bromus erectus*, *Trisetum flavescens*, *Helictotrichon pubescens*, *Phleum bertolonii*, *Anthoxanthum odoratum*.

SCRUB

Locally frequent: *Crataegus monogyna*.

Rare: *Rosa canina* s.l., *Prunus spinosa*.

HAYFIELDS

The two open areas in H and I are hayfields on the clay. It is believed that these were not planted till about 1955. *Dactylis glomerata* and *Agropyron repens* are co-dominant. If the hayfields were planted in 1955 it is difficult to account for the position of *Agropyron repens* which is usually considered a pernicious weed and hardly likely to be sown. It seems most likely that *Dactylis glomerata* was intended by the farmer to be the dominant plant. The leys were not well established at the date of the survey and it will be seen from list 17 giving the 52 species occurring that many were in the nature of weeds rather than proper inhabitants of a sward. The hayfields were mown during the survey.

LIST 17

HAYFIELDS

Co-dominant: *Dactylis glomerata* (Cock's-foot Grass A-I), *Agropyron repens* (Couch Grass ADF-I).

Very abundant: *Rumex acetosa* (Common Sorrel AC-EHI).

Abundant: *Alopecurus pratensis* (Meadow Foxtail DEHI).

Very frequent: *Cirsium arvense* (Creeping Plume-Thistle AC-FHI), *Taraxacum* sp. (Dandelion A-I).

Frequent: *Ranunculus acris* (Meadow Buttercup ABD-I), *Potentilla reptans* (Creeping Cinquefoil AC-EHI), *Convolvulus arvensis* (Field Bindweed ABDEHI), *Veronica chamaedrys* (Germander Speedwell A-I), *Plantago lanceolata* (Ribwort Plantain AC-EHI), *Poa trivialis*.

Locally frequent: *Agrostis alba* s.l.

Occasional: *Knautia arvensis*, *Centaurea scabiosa*.

Local: *Ranunculus repens* (Creeping Buttercup ACF-I), *Achillea millefolium* (Yarrow AC-EHI), *Anthoxanthum odoratum* (Sweet Vernal-grass DEHI).

Rare: *Ranunculus bulbosus*, *Sinapis arvensis* (Charlock I), *Lepidium campestre* (Field Pepperwort I), *Hypericum perforatum*, *Silene vulgaris*, *Cerastium holosteoides*, *Stellaria graminea*, *Atriplex patula*, *Trifolium pratense*, *Lotus corniculatus*, *Lathyrus pratensis*, *Agrimonia eupatoria*, *Aphanes arvensis* s.l. (Parsley Piert I), *Heracleum sphondylium*, *Polygonum aviculare* s.l. (Knot-grass CFI), *P. convolvulus* (Black Bindweed I), *Rumex crispus*, *Origanum vulgare*, *Prunella vulgaris*, *Galium mollugo*, *G. verum*, *Senecio jacobaea*, *S. vulgaris* (Common groundsel HI), *Bellis perennis*, *Chrysanthemum leucanthemum*, *Centaurea nigra* s.l., *Sonchus arvensis*, *S. asper*, *Luzula campestris*, *Festuca rubra*, *Lolium perenne*, *Poa pratensis* s.l., *Bromus mollis* s.l., *Phleum pratense*.

WASTE PLACES

Garden rubbish, building materials, etc., have been dumped in several places which are sometimes overgrown. There are also areas that have probably been disturbed in the past and are now overgrown, and roadsides, etc. These waste places, although not extensive areas, support a wide variety of species but most of these are found in the vicinity and list 18 omits these and gives the remaining 74 species which may be said to form a wasteland element of the flora. *Anthriscus sylvestris* and *Urtica dioica* are locally abundant but otherwise the flora is very mixed and variable.

LIST 18

WASTE PLACES

Locally abundant: *Anthriscus sylvestris*, *Urtica dioica* (Great Nettle A-I).

Frequent: *Holcus lanatus*.

Locally frequent: *Aegopodium podagraria* (Gout-weed FH),

Occasional: *Geranium dissectum* (Jagged-leaved Crane's-bill AC-EH), *Rumex obtusifolius* (Broad leaved Dock AC-F), *Plantago major*, *Cirsium arvense*, *Lolium perenne*, *Dactylis glomerata*, *Bromus sterilis* (Barren Brome B-F), *Agropyron repens*, *Arrhenatherum elatius*.

Local: *Lamium album* (White Dead-nettle BEFI), *Bromus mollis* s.l. (Soft Brome A-CEHI).

Rare: *Ranunculus repens*, *Diploaxis tenuifolia* (Wall Rocket A), *Capsella bursa-pastoris* (Shepherd's Purse CFI), *Armoracia rusticana* (Horse-radish F), *Sisymbrium officinale* (Hedge-mustard D), *Stellaria media*, *Malva moschata* (Musk Mallow A), *Trifolium pratense*, *T. repens*, *T. dubium* (Lesser Yellow Trefoil AB), *Lathyrus pratensis*, *Potentilla anserina* (Silver-weed A-CE), *P. cf. anglica* (Trailing Tormentil F), *P. reptans*, *Epilobium hirsutum* (Codlins and Cream AI), *Chamaenerion angustifolium*, *Torilis japonica*, *Conium maculatum* (Hemlock BF), *Pastinaca sativa*, *Heracleum sphondylium*, *Daucus carota*, *Polygonum aviculare* s.l., *Rumex crispus* (Curled Dock AFHI), *Anagallis arvensis* (Scarlet Pimpernel A), *Calystegia silvatica*, *Solanum tuberosum* (Potato F), *Veronica hederifolia*, *Odontites verna*, *Lamium purpureum* (Red Dead-nettle F), *Galeopsis tetrahit* s.l., *Sambucus nigra*, *Tussilago farfara* (Colt's-foot AEI), *Solidago cf. canadensis* (Garden Golden Rod A), *Achillea millefolium*, *Matricaria matricarioides* (Rayless Mayweed I, track), *Artemisia vulgaris* (Mugwort AI, trackside), *Arctium* sp. (Burdock ABD-FHI), *Carduus acanthoides* (Wetted Thistle C-FH), *Cirsium vulgare* (Spear Plume-Thistle B-EHI), *C. palustre*, *Lapsana communis*, *Leontodon hispidus*, *Sonchus asper*, *Crepis capillaris* (Taraxacum sp. *Carex muricata* s.l. (Greater Prickly Sedge AH), *Lolium multiflorum* (Italian Rye-grass C), *Poa annua*, *P. trivialis*, *Cynosurus cristatus*, *Triticum* sp. (Wheat EH), *Hordeum murinum* (Wall Barley C), *Hordeum* sp. (Barley E), *Trisetum flavescens*, *Agrostis gigantea*, *A. stolonifera* (Marsh Bent ADE), *Phleum bertolonii*, *P. pratense*, *Alopecurus pratensis*.

POND

There is a small pond in I no doubt originally dug to provide water for animals. The permanently wet portion in the centre covering three-quarters of the pond is dominated by *Glyceria fluitans* s.l. *Lemna minor* is frequent in the open water (when it is present) round the edges. List 19 gives the 7 species present.

LIST 19

POND

Dominant: *Glyceria fluitans* s.l. (Flote-grass I).

Frequent: *Lemna minor* (Common Duckweed I).

Rare: *Ranunculus repens*, *Epilobium hirsutum*, *Solanum dulcamara*, *Bidens cernua* (Nodding Bur-Marigold I), *Alopecurus geniculatus* (Marsh Foxtail I).

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Some Records of Mammals, Reptiles and Amphibians from North-West Kent

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THE following personal notes arrived too late for inclusion in R. S. R. Fitter's summary of records up to 1956 (*Lond. Nat.*, **39**, 18-21, 1960). They mainly refer to the years 1949-58, but also include some records for previous years.

Mole (*Talpa europaea*)

Abbey Wood Marshes: several fresh "tumps" in marshy pasture, 31 December, 1950.

Common Shrew (*Sorex araneus*)

Eltham Common: one found dead on 23 April, 1946.

Fox (*Vulpes vulpes*)

Dartford Marshes: one seen at 8 a.m. on 9 November, 1952.

Stoat (*Mustela erminea*)

Dartford Marshes: one on 8 June, 1952; one on 29 June, 1952 seen prancing about on the grassy verge of the road to Long Reach Tavern surrounded by a large gathering of excited House Sparrows. We (D. Goodwin and J.F.B.) watched for a minute or two, but it saw us and ran across the road into the dyke, scattering the sparrows, and we did not see it again. On the same date Goodwin and I chanced upon another Stoat crouching only a yard or so from a Red-legged Partridge. Goodwin took out a Lapwing call-pipe and began to blow frequent blasts on it. The effect on the Stoat was startling! It was clearly puzzled and fascinated by the sound, because it commenced to run madly round and round us—only a few feet away. On one occasion it came right up to Goodwin's feet. Finally, after a few minutes, it must have realized we were making the sound and swiftly departed.

Weasel (*Mustela nivalis*)

Petts Wood: one seen crossing a path into bracken on 19 September, 1948. Stone Marshes: one hunting along a reedy dyke on 23 April 1950; another running round a haystack on 7 January, 1951.

Brown Hare (*Lepus europaeus*)

Crayford Marshes: one on 23 March, 1951. Still reported by allotment holders at Abbey Wood Marshes (1957).

Water Vole (*Arvicola amphibius*)

Plumstead Marshes to Swanscombe Marshes: still common (1957-8). Ruxley Gravel Pit, Foot's Cray: two on 10 October, 1948.

Grey Squirrel (*Sciurus carolinensis*)

Greenwich Park: two in "Wilderness" on 26 December, 1951; one in Middle Sanctuary (mobbed by titmice and Blackbirds) on 8 March, 1952; two in "Wilderness" on 11 April, 1952; one seen burying and collecting acorns in the Flower Gardens on 12 October, 1952; two in "Wilderness" on 3 August, 1953 seen eating piece of fungus; three in Large Sanctuary on 13 February, 1958. Shooters' Hill: eight seen together in Oxleas Wood on 12 December, 1946 (all ran up same tree on my approach); one in Falconwood on 19 October, 1947; two in Oxleas

Wood on 17 May, 1958. Elmstead Wood: several on 22 June, 1946; one on 21 June, 1947; one on 20 November, 1948. Sundridge Park: two on 23 January, 1949. Hayes Common: one in pinewood on 12 December, 1948; two on 18 December, 1948; two on 24 June, 1950. Keston Common: several on 12 June, 1946; "numerous" on 7 July, 1947; one carrying bunch of dead leaves, 23 February, 1948; one in pinewood attacked and driven off by nesting Nuthatches, 7 May, 1949. Joyden's Wood; several seen on 16 October, 1949, also several dreys.

Fallow Deer (*Dama dama*)

Greenwich Park: nine in herd in "Wilderness", including one young buck, 23 February, 1952; fourteen on 22 February, 1953; at least twelve on 13 February, 1958, including five bucks.

Common Lizard (*Lacerta vivipara*)

Dartford Marshes: one on 30 April, 1950; two on river-wall on 2 May, 1952. Stone Marshes: one on 19 April, 1952. Stone Village: five basking in the sun on a log in a chalk-pit on 21 June, 1953. Swanscombe Marshes: one on rough ground on 30 July, 1950. Magpie Bottom, Nr. Eynsford: several seen on laneside banks on 5 October, 1952. Holwood Park, Keston: several on 24 April, 1949.

Grass Snake (*Natrix natrix*)

Holwood Park, Keston: one on 24 April, 1949: Stone Marshes: one on 9 July, 1950; one on 23 July, 1950.

Edible Frog (*Rana esculenta*)

Dartford Marshes: I saw two in a dyke near the mouth of Dartford Creek on 30 April, 1950 and three or four in the same dyke on 9 July, 1950, which I think were this species.

REFERENCE

FITTER, R. S. R., 1960, Further records of Mammals, Reptiles and Amphibia in the London Area. *Lond. Nat.*, 39, 18-21.

Mammal Recording in 1961

By W. G. TEAGLE

APPEALS made at Society meetings have resulted in a welcome increase in the volume of mammal records for the Area, and some members, particularly in the S.W. sector, are making a thorough search for these vertebrates in an attempt to gain a more comprehensive knowledge of their distribution. There is, however, a very poor response so far from north of the Thames, particularly from Hertfordshire and Essex.

Members are reminded that records of *all* species, except the House Mouse and Brown (Common) Rat, are wanted, and notes of even these two almost ubiquitous rodents would be appreciated if of special interest. Maps showing the distribution of some of the commoner species (Fox, Badger, Rabbit, Grey Squirrel, Hedgehog and Mole) are being prepared, and in the course of time similar maps for other mammals may be produced. In order that occurrences may be plotted accurately, the Recorder would be grateful if members submitting information would state the *precise* locality at which the observation was made, giving the name of the

road if in a built-up area, or the National Grid Reference if in the country or in a large open space like Epping Forest or Hampstead Heath.

The survey of the distribution of the Badger and Fox, started in the autumn of 1959, has progressed, although at a slower pace than in 1960. Over 120 Badger setts had been visited by December, 1961, and many woodland areas and other suitable habitats have yet to be visited, particularly on the north side of the Thames. The Fox is now well established in the suburbs, especially in Metropolitan Kent and Surrey, despite continual persecution.

The use of Longworth small mammal traps at Northwood, Pinner Park, a wood near Brookman's Park, at Lower Wood, Claygate and at several localities in the Esher and Walton-on-Thames district has added considerably to our knowledge of the range of shrews, voles and mice, including the Yellow-necked Mouse *Apodemus tauricus* (*A. flavicollis*). The Harvest Mouse, at one time thought to be extinct in the Area, was located at a new locality in Middlesex, three localities in Kent, and four localities in Surrey, suggesting that this tiny mammal has been overlooked in recent years and is more frequent than has been realized. Other outstanding records include escaped Coypu at Brentwood Sewage Farm, a Serotine at Weybridge, Muntjac at Cuffley Great Wood and in woodland in the Lea Valley, and an immature female Lesser Rorqual stranded at Kew on 12 July, apparently the first occurrence of this cetacean for the Society's Area.

The Conservation Corps in the London Area

By BRUCE ING

SINCE its formation in early 1959, the Conservation Corps of the Council for Nature has been closely connected with the London Area and with the Society. The first task of all was carried out at Box Hill and since then parties have worked in many sites in the area at week-ends.

Although the main function of the Corps has been to remove thorn scrub from the chalk, other features of the work are of equal importance. This article has been written to show how the Corps is helping London naturalists to maintain the wealth of interest in this unique area. A detailed account of a particular task (Bookham Common) is given elsewhere (see page 74).

KENT

The Kent Naturalists' Trust has been running week-end work parties for many months at such sites as Darwin's Bank, Downe, the Isle of Sheppey and Queendown Warren. The Corps has been asked to help on sites near London and this season the following tasks will be considered.

Darwin's Bank is so called because it was here that the great naturalist made his observations on orchid pollination. All the orchid species, except one, which were there in his time, may be found to-day, but, as in many similar sites, they are threatened by encroaching scrub.

Keston Common is famed for the small bog which still exists there. Unfortunately this is being overgrown with small pines and these will be removed.

Juniper Hill, Shoreham, supports one of the few wild colonies of juniper in Kent and some selective scrub clearance round the bushes is required if the juniper is to continue to flourish and regenerate.

Ruxley Ponds, Sidcup, are valued for their ornithological and botanical interest. The banks of these gravel-pits are overgrown with scrub and some of this will be removed.

SURREY

The majority of week-end activity is in Surrey, where work has been undertaken on behalf of the Surrey Naturalists' Trust, the National Trust and the Royal Society for the Protection of Birds. Undoubtedly the most important achievement has been the opening up of *Juniper Slope* on *Box Hill*.

The Corps began work here in February 1959 and has since paid ten visits. The problem was largely caused by the outbreak of myxomatosis in 1953 and the sudden decrease in the rabbit grazing. The part played by the rabbit in keeping down scrub was not realized until the lack of rabbits resulted in a wealth of scrub. This change in the chalk, and heathland, aspect of our countryside is alarming and, because it is so widespread, a matter of urgency. Hence the large amount of time spent working in such areas.

The dogwood on *Juniper Slope* was very dense and tall and preliminary cutting by hand was the only satisfactory means of control. Nowadays, mowing is effective and also keeps the tussock grasses in check. Under the scrub the orchid populations declined and not until the summer of 1961 was an improvement noticed, and a very spectacular one it proved to be.

A similar problem was faced at *South Hawke*, Woldingham, where a rare plant was under pressure from scrub, as was the typical chalk vegetation. Since scrub clearance the plant has fruited freely and the variety of the flora returned.

The work at *Bookham Common* is described on page 74.

A quite different task has been started at *Brooklands*, Weybridge, in the grounds of the Brooklands Technical College. The old parkland with many fine trees, especially species of *Prunus*, *Carpinus*, *Cedrus*, *Abies*, *Cupressus* and *Cephalotaxus*, has been completely overgrown with *Rhododendron*. Much of this has now been cleared away and the restoration of open woodland conditions is imminent. Adjacent to the woodland is a fine lake, some swamp and reed-marsh. This variety of habitat will make the area an ideal educational reserve. *Corydalis claviculata* abounds here as does the rhododendron leaf-hopper, *Graphocephala coccinea* Forster, and from rotten rhododendron wood I made the first British gathering of the myxomycete, *Reticularia intermedia* N.E.N.-B.

Other sites visited in Surrey outside the Society's area include Haslemere Museum; Barfold Copse, Haslemere; Thursley Common; Hindhead Commons; Witley Common and Seale chalkpit.

ESSEX

The only site to date is *Chingford Plain* where a programme of hawthorn removal has been started. Thorn is rapidly spreading over the plain and the aim of the work is to check the spread, not to eradicate it completely, even if this were possible. Many of the larger clumps are not used as roosts and these are being broken up to give small isolated clumps which

have proved very attractive, especially to finches. The removal of scrub also helps the return of acid grassland conditions where one of the most abundant and attractive plants is *Galium saxatile*.

HERTFORDSHIRE

Work in Hertfordshire has been carried out at the request of the Hertfordshire Natural History Society and Field Club and one site in particular has been of great interest to members of our own Society. I refer to the small bog near *Wormley Wood* in which grow *Epipactis palustris*, *Gymnadenia conopsea* ssp. *densiflora*, a number of rare sedges and interesting mosses and charophytes. Unfortunately the bog was becoming choked with willow, *Salix cinerea*, and this was drying out the most important part. The willow has been removed by the Corps and we must wait for another season to determine if the work is a success.

Another site of interest is the group of ponds on *Chorleywood Common* where *Ranunculus lingua* still flourishes. Again, willow was the problem as, not only were the bushes drying out the pond on the corner and overgrowing the spearwort, they were also concealing a dangerous road junction. The local Council would have used a tractor to remove the willows with possibly serious results to the spearwort, but they readily agreed to a suggestion that the Corps should tackle it instead. Associated with the growth of willow is the blanket of *Typha latifolia* which has developed. This has also been removed and it is hoped that the valuable fauna, which includes the Crested Newt, will be saved from extinction. Aquatic species of *Veronica* are also involved. The co-operation of the Chorleywood Urban District Council in this matter has been particularly gratifying and much good will now exist.

Other sites in the county where week-end work has been organized are Aldbury Nowers, Tring, where scrub was threatening the pasque-flower, and Bricket Wood Scrubs.

MIDDLESEX

It is surprising that only two sites may be credited to the Corps in London's county, but our long association with one of them balances the lack of variety.

Perivale Wood is owned and maintained by the Selborne Society as a bird sanctuary and educational reserve. From time to time the Corps has assisted in clearance work and in the construction of a pond, an enjoyable, though messy, undertaking which has already shown success in the plants and animals attracted to it. Members of the Corps are also assisting in the current survey of the wood.

Harefield Pit is famous as a geological site and it was mainly for this reason that the Corps was asked to work here. The main task was to expose the junction of the Reading Beds with the true base of the London Clay. Access to the exposure was also improved and other small jobs in providing new exposures carried out. It is hoped that visiting geologists will co-operate by doing any necessary weeding to prevent colonization of the main exposure.

BUCKINGHAMSHIRE

No tasks in this county actually lie within the Society's area but one, at Hedgerley, is so near, that a mention will be made.

Church Wood, Hedgerley, is a small woodland reserve owned by the Royal Society for the Protection of Birds and wardened by the Middle

Thames Natural History Society. The work here consisted mainly of making paths and birch clearance. Not only is this a very useful bird reserve; it also contains a flourishing colony of *Helleborus viridis* and some of the nearest wild primroses to London.

The above account demonstrates the variety and scope of week-end work in the London Area and future work is planned on the same lines.

In conclusion may I point out that successful conservation of sites of interest primarily depends on accurate information being provided by the man in the field, both as to the nature of the threat and the present composition of the flora and fauna. Any site which appears favourable for the experimental approach which the Conservation Corps adopts should be reported to your County Representative or to the Conservation Committee. Enquiries about the work of the Corps are always welcome and should be addressed to the writer at 41 Queen's Gate, S.W.7.

Books

Land Invertebrates. A guide to British Worms, Molluscs and Arthropods (excluding Insects), by J. L. Cloudsley-Thompson and John Sankey. 156 pp. with numerous line drawings in text. Methuen, 1961. 16s.

The authors of this pocket volume need no introduction to our Society and it is a pleasure to recommend it, with one or two minor reservations, as an extremely useful guide and authoritative within the limits it sets itself.

In it, identification is extended to a sector of the animal kingdom not normally covered in field guides and one which perhaps the real beginner would not wish to tackle; but it would seem that the authors intend it to serve sixth-form biologists and the keener amateur willing to work with a good lens, and to such it presents an opportunity to explore a rich new field with some hope of understanding its systematics—and where better to start than at Juniper Hall?

The various Arthropod orders included are considered in fair detail, but of necessity the treatment given to Worms and Molluscs is more restricted. Identification is generally aimed at generic level but in many cases is extended to "most probable species". One could have wished to see all the groups included keyed and, in fact, the six pages given to the index of figures could have been much more profitably employed for this purpose.

A few items of nomenclature call for some tidying up and no doubt, by its use, more knowledge about distribution will accrue rapidly and will, it is to be hoped, be included in future editions.

The book is generously illustrated by interesting line drawings of many species, and points of structural interest are clearly pointed out to aid the study of each group in turn; the whole book is pleasingly produced.

J.F.S.

Birds and Woods, by W. B. Yapp. London; Oxford University Press, 1962. 35s.

A book on the ecology of woodland birds has been long awaited and the present study goes far to fill this gap in the literature. The author has studied the habits and in particular the numbers of the different species of birds in many varieties of woodland. He used a technique of timed line-transect counts made at a constant walking speed and obtained relative figures for species abundance and these figures are compared in various woods. There are interesting tables indicating the bird populations in this way. It would, however, have been helpful to the more casual reader if the tables included occasional footnotes explaining the significance of the special terms, as these definitions are not easy to find in the text.

There is a chapter on the English woodlands (which includes Scotland!) followed by others on the birds of the main types and also of developing woods, hedgerows and even walls of fields. Frequent reference is made to this Society's survey of the birds in pedunculate oakwood at Bookham. There is a very interesting section on the inter-relations of the community and another on the problems of distribution where an attempt is made to link distribution with habitat, climate, temperature and sunshine. The history of the British woodland avifauna is discussed and this is followed by a systematic list giving further information. Throughout there are frequent comments on recent studies of woodland bird ecology.

The original field work forms a good example of the value of applying a counting technique in different habitats and should encourage others to use similar methods to help complete the picture. The lay-out of the book is pleasing. There are 18 tables, 24 figures chiefly maps, a collection of 12 habitat photographs, a frontispiece by C. F. Tunnicliffe and woodcuts from Thomas Bewick. The author is to be congratulated and his book recommended. It will be invaluable for reference for many who are interested in woods and birds.

G.B.

A key to the Nymphs of the British species of Ephemeroptera, by Dr. T. T. Macan, 1961 (Scientific Publication No. 20 of the Freshwater Biological Association priced at 4s. 6d.)

The high standard which is associated with this well-known series continues to be maintained with the latest addition. This work replaces the key to the genera of the nymphs which was compiled by Kimmins (1954) (No. 7 in the series). Since that time a considerable amount of original investigation has taken place, much of it by Dr. Macan himself. As the mayfly spends nearly all its life in the nymphal stage, "pond dippers" will find this booklet a particularly helpful one for identification. All known British species are keyed out. This work contains a new feature for the series—life histories condensed into diagrammatic tables. From these it is clearly seen that the best time for collecting nymphs is in the early spring when the majority are fully grown. Details of the types of habitat are given and there is a series of distribution maps. A glance at these show that this Order has been much neglected in the past and the distribution of our Ephemeroptera is but imperfectly known. The booklet is particularly well illustrated. There is still a great deal of original work to be done and with the help of this key entomologists will be stimulated to undertake the task and increase their knowledge of our native fauna.

D.G.H.

Statement of Accounts

						GENERAL		
1960			Receipts			1961		
£	s.	d.				£	s.	d.
1,722	18	4	Subscriptions Current	...	...	1,727	16	6
38	15	0	Subscriptions Arrears	14	5	0
43	0	0	Subscriptions Advance	38	17	6
45	17	6	Entrance Fees	44	15	0
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1,850	10	10						1,825 14 0
100	0	0	C. L. Collenette Bequest	— — —
5	3	6	Donations	189 14 6
2	12	6	Interest £75—3½% War Stock	2	12	6
5	8	0	Interest £180—3½% Savings Bonds 60/70	5	8	0
25	2	6	Interest Deposit Account	37	3	6
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7	0	0	Rents	45 4 0
14	5	7	Sale of Christmas Cards	— — —
—	—	—	Sale of Books, Bookcases and Christmas Party	86 14 7
64	9	2	Balance in hand 31.10.60	18 11 9
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						PUBLICATIONS		
62	5	2	Sale of Publications	102 7 11
65	0	0	Grant from Royal Society	150 0 0
22	12	0	Advertisements	15 10 0
979	4	9	Transferred from General Account	1,103 19 5
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£1,129 1 11						£1,371 17 4		
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						“ LONDON’S BIRDS ”		
			B.B.C. performing fee	15 15 0
			B.B.C. for damaged film	15 0 0
			Transferred from “ Birds of London Area ” account	62 3 8
			Grant from General Account	82 4 7
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						LIBRARY		
			Grant from Royal Society for binding periodicals	100 0 0
			Cash held by Librarian 31.10.61	37 15 8
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						£137 15 8		
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						RESERVE		
			Balance 31.10.60	275 0 0
			Transferred from General Account	125 0 0
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						LIFE COMPOSITION		
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Audited and found correct

24 April, 1962

Year Ending October 31, 1961

ACCOUNT

1960	Payments						1961
£ s. d.							£ s. d.
163 3 0	Hire of Rooms and Halls	...	...	...	...	...	220 14 6
56 8 2	25 Eccleston Sq. Rent and Cleaning	...	...	...	...	...	29 18 6
5 12 7	25 Eccleston Sq. Gas	...	...	...	...	...	4 14 9
10 14 0	25 Eccleston Sq. Fittings	...	...	...	...	...	11 7 7
60 19 8	25 Eccleston Sq. Decorating	...	...	...	...	...	— — —
154 19 6	25 Eccleston Sq. New bookcases	...	...	...	...	...	34 4 6
25 0 0	Library and cost of move	...	...	...	...	...	34 11 0
67 6 8	Printing and Stationery	...	...	...	...	...	70 17 1
150 0 0	General Secretary's Honorarium	...	...	...	...	...	150 0 0
25 18 9	General Secretary's Telephone	...	...	...	...	...	30 4 9
45 19 3	General Secretary's etc., Postages	...	...	...	...	...	44 4 9
22 8 0	Subscriptions to other Societies	...	...	...	...	...	21 8 0
84 19 6	Sectional and Group Grants and Expenses	...	...	...	...	...	118 10 4
6 18 9	Insurance	...	...	...	...	...	5 8 9
13 13 11	Sundries	...	...	...	...	...	18 8 4
— — —	Slide Projector	...	...	...	...	...	32 18 10
82 13 10	Grant to Bird Film Account	...	...	...	...	...	82 4 7
979 4 9	Grant to Publications Account	1,103 19 5
100 0 0	Trans. to Reserve Account	125 0 0
18 11 9	Balance in hand 31.10.61	27 3 2
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ACCOUNT

128 0 0	Programme 1961	130 15 0
586 0 7	London Naturalist No. 40	542 6 0
	L.B.R. No. 24	...	...	...	409 9 9		
	Less L.B.R. No. 24 Reserve	...	...	...	270 0 0		
37 11 3							139 9 9
270 0 0	L.B.R. No. 25 Reserve	450 0 0
36 17 10	Addressing and Wrapping	43 16 2
70 12 3	Postages	65 10 5
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FILM ACCOUNT

Cost of film and copying for year ending 31.10.61	...	100 3 3
Reserve for hire of " Festival Hall "	...	75 0 0
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ACCOUNT

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ACCOUNT

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ADDITIONS TO THE LIBRARY

Few new books are being bought for the library whilst it is in store at Queen Mary College; but a number of purchases were approved by the library committee before the removal from Eccleston Square, and several books have been generously donated by members.

The principal additions made to the library during the year were as follows:

- Barrett, John, and C. M. Yonge, *Pocket Guide to the Sea Shore* (1960);
 Butcher, R. W., *A New Illustrated British Flora*, Volume I (1961);
 Cornwallis, R. K., and A. E. Smith, *The Bird in the Hand* (1960);
 Fox, H. Munro, and Gwynne Vevers, *The Nature of Animal Colours* (1960);
 Friedlander, C. P., *Heathland Ecology* (1960);
 Gilbert-Carter, H., *Glossary of the British Flora* (1950);
 Hendel, Friedrich, *Trypetidae* (n.d.);
 Hollom, P. A. D., *The Popular Handbook of Rarer British Birds* (1960);
 International Ornithological Congress, *Proceedings of the XIIth* (2 vols.—1960);
 Leutscher, Alfred, *Tracks and Signs of British Animals* (1960);
 Oldroyd, Harold, *Insects and Their World* (1960);
 Reid, Douglas, *Elementary Ecology* (1959);
 Smith, Malcolm, *The British Amphibians and Reptiles* (revised edition—1954);
 Tenison, W. P. C., *Zoological Record: Aves*, 1958 (1959);
 Tenison, W. P. C., *Zoological Record: Aves*, 1959 (1960);
 Williamson, Kenneth, *Identification for Ringers: I* (1960).

As usual, a large number of periodicals, journals, transactions, etc.—many of which will be bound in due course—were added to the library during the year as a result of subscription, on an exchange basis, or through the Society's reading circles.

PAPERS for the *London Naturalist* should be sent not later than 31 December to the Editor, R. M. PAYNE, 8 Hill Top, Loughton, Essex.



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also

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An Easter School in Field Geology and Field Botany is being
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**Further particulars from the Deputy Director (Extn. N.),
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Please state the particular course or courses in which you are interested.

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